The Builder.

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Another Look at Bethnal-green Museum.

THE contrast between the plain, unpretending exterior of the building at Bethnal-green, and the opposite character of some of the articles at present grouped in it for exhibition, suggests the reflection whether, regarded in a certain light, the outside aspect is not the more suitable of the two, more in keeping at least with the manners and associations of the district. Of course we are not here thinking of the pictures, the best of which are things that may be equally welcome in palace or cottage; but the articles of ornamental art (furniture, &c.), with which the ground-floor is largely taken up, appear to us not quite the best kind of thing to place in a free exhibition in such a quarter. A large proportion of them, indeed, would be the wrong kind of thing anywhere, consisting as they do to a great extent of that class of modern French *objets de luxe*, such as candelabra, timepieces, bronze and gilt statuettes, &c., the worth of which consists much more in the value and showiness of the material than in any excellence of artistic design, or even of execution. We do not forget that they are intended, to a certain extent, to serve as incentives of workmen in various branches. Still, rather than these gold and ormolu "Cupid and nymph" things, we would like to see a good proportion of the collection illustrating the application of elegance and refinement of treatment to the ordinary furniture and appurtenances of humbler life, not necessarily altogether in a cheap form, but at all events in a form in which the money value of the articles was not their most important claim to attention. In the upstairs cases there are here and there very beautiful specimens of ornamental work, chiefly Italian, but in the collection which first strikes the eye downstairs, gaudiness and mere meretriciousness are the main characteristics. This, as it seems to us, is to be regretted.

As to the pictures which form the main attraction at present, a glance round them in a comprehensive and consecutive manner, may still be *apropos*, more especially as indicating the extent and manner in which different schools are represented. The arrangement of the pictures, by the way, the larger works round the wall and the smaller ones on screens, is very good, and enables each class of work to be well seen. The English school is not largely represented, and chiefly by portraits, including two or three of the best known and finest by Reynolds and Gainsborough. In one of the Gainsborough portraits of a young lady sitting under a tree, the pet dog seated beside her on the bank is a masterpiece in truthfulness of action. Romney's portrait of "Mrs. Robinson" (19) tends, along with other works at present in Burlington House, to raise his name very much above its conventional standing, and puts him nearer Reynolds than it has been the fashion to reckon him. Certain Lawrences in the vicinity look sadly depreciated in such company; and two pieces of tame classicality (*i.e.*, nudity), by Westall and Hilton, are among the things which like some of the Frenchified gilt curiosities downstairs, seem out of place here. It appears scarcely desirable to place subjects of this kind before uneducated spectators, who are apt to take (to say the least), a very vulgar view of them; more especially when they happen, as in this case, to be very poor art. Such a thing as the small "Tarquin and Lucretia," of Cagnacci again (257), in which the subject is certainly not very delicately handled, might as well not have been hung. Not that there is any large proportion of works here to which such a consideration would apply; but, in regard to Art Exhibitions for the masses, the point is worth a remark, whether anything is gained at present by puzzling their propriety with paintings of which they only take in the hard fact, not the underlying ideal: since what a recent writer in the *Contemporary Review* has termed "the law of modesty in art" is not very well understood at present, even among the upper classes in English society. Worth some dozens of average nymph and Venus pictures are Vandyck's grand portraits of "Philippe le Roy and his Wife" (59, 63), lent by the King of Holland, the very embodiments of stately patrician dignity and sense of power.

The multifarious collections of dead game, and so forth, by Weenix, in this vicinity, do not raise one's idea of this somewhat over-valued painter of "still life"; the colours are harsh and crude often, and the texture and brilliant light reflections proper to plumage and fruit are sometimes strangely ignored. "Vulgar," it is to be feared, must be written against these productions, by those who are not taken in by the prestige of a name. Nor do the landscapes of Ruysdaël and Hobbema, as seen in conjunction here, altogether realise their reputation. There are finer Ruysdaëls in existence, certainly, than these, but many of this painter's works tell better in engraving than in their original form. The composition is "romantic," "picturesque," and such other adjectives, but then the colouring and the detail, in rocks and water especially, is not that of nature. The Hobbemas are tame, and also with a grey colour not pleasant to the eye. The artist's diploma picture, painted for the Amsterdam Academy (76), in which one would suppose that he would put forth his best powers, is certainly not a work to make much talk about. Both's glowing landscape (90) is a much intenser work, a pleasant atmosphere to be introduced to, and which tells the more from juxtaposition with the small cool Claude (92), which in truth it rather overpowers. The half-length of the Earl of Leicester (94), by Sir Antonio More, is worth attention, for the picturesque and unusual dress, and the pains which the painter has bestowed upon it. The immense advantage which the old portrait-painters possessed in the costumes of their sitters ought to be always taken into account in drawing any comparisons between the artistic results of modern and ancient portrait-painting. Rembrandt's "Youthful Head" (103), his better-known portraits of the "Palekan Family" (100, 107), and his superb "Portrait of an Old Lady" (113), which has been in one of the recent Burlington House exhibitions, are all masterpieces in their way, and things which one is always glad to meet again. Vandyck's "Wife of Cornelius de Vos" (116), with less power than some of his works, may be noted as one of the most beautiful and interesting faces ever seen upon canvas. Two half-length portraits of Jane Seymour and Edward VI. (111, 115), with the name of Zucchero on the frames, but which are more cautiously labelled in the catalogue, "artist unknown," are worth special attention. These are hardly-painted pictures, in low tones on a very dark ground, somewhat resembling in general treatment the small profile portrait by Pietro della Francesca, No. 195 in the present Burlington House collection. In the "Jane Seymour," the drawing of the features is a little stiff and angular, but the general effect, with the pale dress only a little darker than the flesh-tint, and the head-dress, in folds of orange and low purple, is most delicate and unusual. In the other the face is better painted, but the colour not equal to this one. The allegorical picture by Porbus, "The Power of Love" (120) (a very sensuous kind of allegory), is well worth attention for its peculiar *motif* and fine colour, and execution of costumes and accessories. On the small screens in this portion of the collection are some of the finest existing specimens of the two great *genre* painters of the school, Ostade and Teniers, in which especially the splendid composition, both as to lines and lights, whereby the former painter glorified the humblest peasant life of his country, may be studied to great advantage. Among these, "Interior, with Peasants" (128), is perhaps the most perfect. A small Terburg, "A Lady at her Toilet" (170), should be particularly studied; it is a masterpiece of tone and execution in regard both to the figure and the painting of the marble column and cornice which form part of the background; there are few things in the Peel collection at the National Gallery to equal this. Among the few Italian pictures Canaletto is predominant, and is seen here to the greatest advantage; "Venice, from the Giudecca" (256), is a particularly good specimen, with its expanse of reddish brown quay in the foreground, which throws back so well the distant city seen across the water. Domenichino's "Woman in Eastern Costume" (252) is a fine thing in the painter's usual bright, cheerful manner; and Conegliano's "St. Katharine of Alexandria" (265), rather crude in colour, is a capital example of what may be called decorative painting, in style and manner. But worth more than all the other Italian works, and, indeed, one of the finest things in the whole place, is the Giorgione, "Venus disarming Love" (263). The tone of the landscape is quite unreal, it is true, but then so are the figures, and the whole thing is in perfect keeping, and suffused with a glow of colours quite magical in its warmth and intensity. There is no Titian worth saying much about; and the Spanish school is represented mainly by Murillo. There is one fine and well-known Velasquez, the portrait of the little "Infante of Spain" (299), looking like an inverted wineglass in his stiff frock, which, for its splendid qualities of execution, is likely to retain its hold on our admiration more permanently than many pictures of a more aspiring type in regard to subject.

The most interesting portion of the picture exhibition, however, is the French collection; interesting, because of its remarkably high average merit, and because it illustrates a school of painters whose works we have not often such an opportunity of studying and comparing; viz., the French painters of the last generation and the older men of the present generation. Here is the larger copy of Ary Scheffer's finest picture, the "Francesca da Rimini" (366); one of the few works in which the artist escaped from the region of mere sentiment, and rose to the expression of passion and tragic power,—a picture far superior in conception and artistic power to the theatrical "Christus Consolator," or the placid "Dante and Beatrice," by which Scheffer is best known to the English public. Of one most remarkable artist of the same period, Decamps

whose works are almost unknown to the public in England, there are no less than thirty-four specimens, including almost all classes of subject. The largest of these, "The Patrol at Smyrna" (35), has been engraved in an English publication; it is one of the finest combinations of humour and of brilliant execution we know of in modern art: the members of the said patrol, in gay parti-coloured dresses, with their commander in the centre, on a white horse, come tearing at full speed down a stepped street, as if they would break their necks and the horses', but otherwise with a stolidity of countenance and manner clearly indicating that this is merely their way of doing the business. Among other admirable works by Decamp, may be mentioned "A Troop Watering their Horses" (337), "Well in Syria" (482), "Turkish Fortress" (498), "Mules at Boulac" (555), a wonderfully clever thing; "Villa Doria-Pamfili, near Rome" (562): whoever will compare these three last-mentioned works, and notice how distinct they are in subject and treatment, and how excellent each is in its way, will certainly form a very high idea of the versatility and power of this artist, who seems never to have sunk into common-place, whatever he attempted. One picture only of his here must be regretted, "An Execution in the East," as an instance of that tendency to paint subjects of horrible cruelty, which is even a greater blot on modern French art than its sensuality in some other classes of subject; it is a pity such a work was hung. Close to "The Patrol" is one of the finest Corots we know of, "Macbeth and Banquo meeting the Witches" (356: the figures, of course, are quite subordinate to the landscape), and near this is a beautiful landscape by Rousseau (353), in which we look into meadow-land and a stream, through an arch of trees in the foreground. Among the older French painters we find on the walls Watteau, represented in some of his largest and best works; notably his "Picnic Party" (398), a charming group of gay figures, among which should be noticed especially the two couples in the background, where a lady is being assisted to rise from her seat by her companion; anything more natural and elegant in manner than these little figures one could not wish to see. Greuze is largely represented, chiefly by heads in his usual manner, and with his usual merits and demerits. One rather elaborate composition, however, "The Broken Eggs" (468), shows this painter in a class of subject in which we seldom see him, and which in humour and feeling partakes of the characteristics of Wilkie, though the humour is at once less delicate and less genuine than that of the Scottish artist. "The Death of Marino Faliero," by Delacroix (371), is a very fine specimen of this painter. That masculine artist and splendid draughtsman, Horace Vernet, is here in great force; among his larger works are "The Arab Tale-teller" and "Joseph's Brethren dipping the Coat" (335, 338); among his smaller works on the screens are noticeable "A Lion Hunt" (505) and "Fishermen Embarking" (536), the latter a charming and natural work,—a single man in a red cap walking over the beach to his boat in a strong sunlight, which throws his shadow on the face of a quay on the right. Of Meissonier, again, there are a number of specimens, of which each seems the best until you look at the next one; among others, the first picture he ever exhibited, "Visitors" (546), in which his peculiar excellences seem already fully developed. Close to this, "Napoleon and his Staff" (546) is a marvel in minute execution of men and horses; all the characteristic power and expression in the countenance of the man whom Victor Hugo celebrated (in a poem) as simply "Lui," are given on a head about the size of a pea. Some others of these little works are quite beyond praise for concentrated power, brilliancy, and expression; we may name particularly "Throwing Dice" (537), "Subject from the Decameron" (564, a beautiful work), and "Travellers Halting" (587). One work by Dupré, "Crossing the Bridge" (595), illustrates this fine and original landscape artist. Couture's "Masqueraders" and "Duel after the Masquerade" (513, 517), should be looked at for their artistic merits, not to speak of the moral lesson conveyed; and the same painter's "Roman Luxury" (493) contains one of the most excellent specimens of drawing and painting of the female figure we have seen, giving the indications of the main points of the framework without losing softness and delicacy of surface—a very difficult achievement. Among the artists of the last generation, Marilhat should be noticed specially for his "Composition: the Erechtheum" (362), and one or two of his Nile scenes. Among the eighteenth-century men, too, Fragonard will repay attention, for a real beauty and originality of feeling in spite of the tendency of his designs, to "prettiness." "The Fountain of Pleasure" (344), engraved a good many years ago in the *Art-Journal*, is a little composition full of sunny, classic feeling and poetry; and the little figure of the "Lady carving her Name" on a tree (570), despite a certain mannerism in the figure, is a bright vision of youthful beauty and *gaieté du cœur*, which tempts one to look lightly on faults of style. On the whole this French collection affords a very full illustration of some of the ablest artists France has possessed during the modern epoch of painting.

The English and French water-colours, on screens on the ground-floor, contain some fine things; Decamps again being predominant among the French, his "Arabs fording a River" (668), and a "Well in the East" (687), being among the best; Marilhat's "On the Nile" (676), a very fine drawing, should also be looked at. Among the English works are a considerable number of those neat and thinly-washed water-colour drawings by popular artists in this school, which are so like each other in style and handling as to savour of art-manufacture. Those by David Roberts are exceptions, and include some sketches in his finest manner; but the things to look at here are some small works by Turner, particularly "Grouse Shooting," and "Woodcock Shooting" (653 and 657): the latter shows Turner in a subject different from what we usually associate with his name. It is a confined view in a cover, with a high bank of trees on the left; the clear manner in which the slope of the ground is shown ascending between the stems of the trees, the small dark fir-tree in front standing out against the rest of the composition, and the ferns in the immediate foreground, all indicated quite precisely in a drawing which is evidently rapidly executed, show the hand of a master in the art. It is worth while to compare the "Grouse Shooting" with Copley Fielding's "Lock Katrine," on the same screen, and notice the difference between genius and mere facility of hand and prettiness. Perhaps there are no things in the art more certain to keep their place than Turner's water-colour sketches.

Our remarks may, perhaps, serve to direct attention to some of the things not always likely to be noticed by general visitors, or mentioned in ordinary reports of this collection of pictures, which it is to be presumed will have to be removed during the ensuing summer. We must add a word in praise of the catalogue, which is arranged in a manner that might be a model for some other picture exhibitions. The names of artists, in the continuous catalogue, are printed in large black type, in the centre of the page, over the title of each picture, so that it is generally easy to find any particular name by a glance down the pages, but the whole is catalogued over again under the head of artists' names alphabetically arranged, giving under each name not only the numbers, but the titles of all the works of each artist exhibited.

ARCHITECTURE IN REFERENCE TO MUSIC.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

ARCHITECTURE practically considered in reference to music was the subject of an elaborate and suggestive paper read by Mr. H. H. Statham, jun., on the 20th of January, and which was illustrated by a number of diagrams. After some account of St. George's Hall, Liverpool, in respect of sound, contrasting with it the Albert Hall, the paper proceeded:—

It is probable that for the largest class of musical performances, the execution of great works of combined choral and instrumental effect, neither the amphitheatrical nor the theatrical form will be found the most suitable. The form of the complete amphitheatre, though its symmetry and simplicity may seem to recommend it, has this serious disadvantage (when used on a large scale) that the sound, as produced in the orchestra, is not properly controlled and confined in the direction in which it is most wanted. A certain proportion must be observed between height and width, and the wide area of an elliptic amphitheatre requires a lofty roof, and consequently a great space for the production of echo; a space into which the sound is launched with nothing to confine it in the direction of the audience, so that a considerable portion flies off to the roof, and is either absorbed there (if absorbent materials are placed to retain it), and so wasted, or it is reflected back again and becomes a source of serious disturbance. Something approaching to the theatre form is better, as the orchestra can then be confined under a lower roof and between side walls, and the sound driven forward more. If employed on a large scale, there is still the same objection of a necessarily lofty roof and vast centre space, in which much sound is lost and dispersed, besides a degree of difficulty in getting all the audience sufficiently in front and facing the music. Accommodation, too, in such a case must be obtained by the use of successive tiers of galleries, which, except in the front row or two, can scarcely ever be so good for hearing as the uninterrupted area. On the whole, therefore, I believe it will be found that the requirements of the case are best met, and the difficulties best avoided by the long form of room, rather than the theatre or amphitheatre form, and that conduction is a more direct and successful way of conveying the sound to the audience than radiation. The waste space of air in a room of this size may be made much less in proportion to the area than in an amphitheatre. The amphitheatre could not be made to look otherwise than ill-proportioned, unless its roof were placed at something like a proportionate height. For the successful conduction of sound in this way through a long building it is essential that the sound, as produced in the orchestra, should be confined from spreading above or at one side of the performers, and reflected forward as strongly as possible; that the height of the auditorium, though greater than that of the orchestra, should not be such as to give room for any unnecessary loss or dispersion of sound, or to allow space for a disturbing echo from the roof; that for the same end the roof should be nearly flat rather than circular, so as not to collect and focus any reflection of sound which may be inevitable. The orchestra should be constructed principally of wood, and the walls of the auditorium lined with wood; but the walls, as well as the ceiling, require to have their otherwise flat surfaces broken at intervals by projections, in order to avoid the conduction of sound along the walls, and break up any reflection from the ceiling; and careful provision must be made against a return echo from the end of the room. So much for the principal acoustic provisions, which have been before laid down from experiment by some of the best authorities on the subject, and in regard to which I need only observe that my own experience, as far as it goes, completely confirms them. But now as to arrangement of the audience and performers in regard to one another. One of the principal advantages of the longitudinal room is that the audience all sit facing and directly opposite to the performers; not only a better position for hearing, but more comfortable in every way; for although we do not hear with our eyes, there is an irresistible tendency to look towards the quarter from which the sound comes; and in a side gallery in a music hall you will always see the audience with their heads all turned sideways to look at the orchestra. A room with a flat floor, however, is always unsatisfactory for hearing, and I hold that the seats should always rise as they recede from the orchestra. When sitting, as I have often done, at the back of a long flat-floored room at a concert, I have always *felt* that the principal volume of sound was over my head, and out of my reach, so to speak. I adopt the principle called by Mr. Scott Russell the "isacoustic curve." The tendency of this curve is to fall near the point of sound production, and to rise again further on; this brings the front rows of the auditory higher up in relation to the performers, so that the sound is not carried so far over their heads as would otherwise be the case. Another point to be considered in placing the audience is, that for a performance on a large scale (which alone we are now considering), no person who wishes to enjoy the music, or to realise its true effect, would ever choose to sit close up to the orchestra. As concert-rooms are generally arranged, it may be taken as a rule that for this class of performance all the first ten or twelve rows of seats, if not more, are thrown away, so far as any real enjoyment of the music goes. Now we generally find, in connexion with concert-rooms, a considerable space in front of the audience end occupied by a large lobby or crush-room, serving mainly as a waiting-place for relieving the pressure of the crowd in going out or coming in.

Now I have proposed here the system of carrying the auditorium to the very back of the building, and making the entrances to the principal portion of it at the sides, between the auditorium and the orchestra, and transforming the space usually occupied by the front seats, in which no one can hear with pleasure, into a vacant space which may act as crush-room or *foyer* before and after the concert, and as a promenade for part of the audience during the interval which generally occurs in the middle of a performance. If this space were laid with parquetry flooring on joists, with a hollow space underneath, it would not only make a very effective entrance to a room, but would probably act as a reflector and reinforcer of the sound from the orchestra. The fact that any of the audience leaving before the close of a concert would have to pass before the performers, may occur as an objection; but it is only the solo performers in front of the platform who are much disturbed by such an untimely exodus, and by the arrangement of the aisles it will be seen that the audience need not pass near them at all. It may be observed that there should never be a centre aisle between the seats in a concert-room, as this places the solo singer opposite an empty strip of floor instead of a range of appreciative countenances. The possibility of draughts to the performers appears a more serious objection to this placing of the entrance, but I think it may be entirely obviated by such an arrangement as is indicated in the plan, of making the lobbies to the ladies' and gentlemen's cloak-rooms the approach to the inner lobby, and having no communication between it and the outer vestibule; and by keeping the inner lobby well warmed, and with a sufficient outlet at the top, any draughts which might be drawn in would be disposed of here, without finding their way into the concert-room. This is of course only a question of ordinary planning; but I think in all cases of entrances to concert-halls some such decisive means should be employed to shut out any access of cold air from without, which is the cause of much indisposition among singers, independently of the discomfort to the audience.

Now in regard to the orchestra: it may be said that the placing of the various performers not only so as to be well heard by the audience, but so as not to incommode or interfere with each other, has been almost entirely overlooked in most cases. It is generally considered sufficient to make a tier of semicircular stages, one behind another, and the band and chorus fit themselves into these in a kind of promiscuous manner, while the solo singers find room where they can in the narrow strip left for them in front of the band. This might have done very well in old days of smaller performances, and when the band was used much more in conjunction with the chorus than it now is, and for the most part played the same notes which the chorus sang. Now the case is very different; the modern band is much more powerful and brilliant than the old one, and is mostly used quite independently of the chorus and in a different manner: and the usual construction of the orchestra, which crowds the band and chorus together, is a double disadvantage. The band is immediately backed, not by any sound-reflecting substance, but by the mass of the chorus, whose dress forms a body of sound-absorbing material; and on the other hand the singers are liable to be put out and disturbed by the noise of particular instruments close to them; for it may be supposed that a chorus-singer is not likely to go through his part the more correctly with a trombone bellowing in his ear something quite different from what he is singing. The construction of the orchestra which I would propose as an improvement would inclose the band with a kind of wooden shell or sound-board bending round them in the rear, and coming under their feet to the front, the stages on which they stand being carried by framing at intervals. The sound-board would be carried above the heads of the upper rank of the band and bent forward over them to some extent; and then above and behind this and on the upper level would be ranged the chorus seats. By this means I expect that the sound of the band would be thrown forward into the room, while at the same time the sound, especially of the louder instruments, the brass and drums (which are always at the back) would be to a certain extent veiled from the singers, who would be able to hear their own voices better, and hear the band as a consentaneous union of instruments, instead of having here and there a particular instrument close to their ears, drowning everything else.

This arrangement of the orchestra in two tiers would be susceptible also of very good decorative treatment. The orchestra as planned by me is intended to accommodate a band of about eighty; a good average number for the best class of band. It may be useful just to mention how the instruments are generally placed, and what space is required for each. A band of this size would include about thirty-two or thirty-four violins, divided into first and second, and occupying the lower stages to left and right of the conductor (who faces them); about twelve tenor violins placed in the middle of the same stages, between the first and seconds; and from eight to ten violoncellos, and nearly the same number of basses, which are usually divided and placed half on each side, behind the violins. Then there are the quieter wind instruments, the wood instruments, almost always eight in number, which should range in a row behind the tenor violins, as sometimes they are kept more to the left; and at the back are placed the drums, and on each side of them the brass instruments. If the stages are made about 3 ft. wide, it will be found sufficient for the violins; the two back rows should be wider, to allow plenty of room for the larger stringed instruments. About 3 ft. longitudinally should be allowed for each violin, and about 1 ft. more for the violoncellos; the basses, which are very bulky instruments, must be reckoned as requiring nearly 5 ft. to each player. A platform, the width of two stages, should be left in the centre of the two top rows for drums, which for want of such a provision are often very inconveniently placed. The wind-instrument players require little more than easy standing-room longitudinally, their instruments not necessitating much action in playing. These details are not quite superfluous, as I knew a case where an architect was instructed to provide room for a band of sixty, and very conscientiously provided standing-room for sixty persons; which did not quite answer. The organ should be at the back of the whole, behind the chorus, to whom it is the greatest assistance; and it should, wherever possible, be rather spread out laterally behind the singers than projecting forward among them in a square mass: the latter is the almost universal arrangement, but it is bad, as it places a part of the chorus on each side in a recess, where they are not well heard and cannot hear each other; which latter point, it should be remembered, is as essential for satisfactory performance. The rest of the space behind the singers would be filled up with a wooden partition like that behind the band, or it may be partially filled by carrying round some of the larger organ-pipes in a segment of a circle, which would add very much to the architectural effect. In the organ height has to be provided for a pipe 32 ft. long, which is the longest used; but these larger pipes may be placed below the level of the visible organ-case; they will be just as well heard, it being an understood thing that the organ is connected with, and supported by, the same system of timber framing which carries the chorus-seats. The organist should *always* be placed below, in front of the whole orchestra, which, now that the electric movement can be applied, is easily done. This is most important; for when the player is caged up close under the instrument he cannot possibly tell what effect he is producing; but there are very few concert-rooms in England where this has been attended to. Lastly, the solo-singers I would have advanced on a small projecting platform of their own, so as to be a little nearer the audience and farther from the band; by this means not only will their voices stand out better, but they will not be incommoded by the too near proximity of the band.

These deviations from the regular arrangement of the orchestra would, I believe, conduce to the more successful and clear performance of music on a large scale, and to the comfort and ease of the performers in going through their work. The auditorium, it may be observed, is not unlike that of Exeter Hall in general arrangement, but the seats there are not arranged on a curve, and the proportions of Exeter Hall are broader and shorter. But, ugly and faulty in many ways as that time-honoured room is, I have never heard the effect of oratorio choruses on a large scale so clearly and satisfactorily as from the back part of Exeter Hall. I attribute this to the raised seats and to the position of the audience directly facing the performers. The ceiling is low, and it is a question of simple construction of sound. In fact, there is too much sound for the place; and I believe that rooms built on this principle, and with the best acoustic principles and arrangement, might be made much longer than they commonly are, without at all losing the effect of the music. In my plan the auditorium is 150 ft. long, exclusive of the space in front of the audience. The length from the front of the orchestra to the back of the hall, in St. George's Hall, is about 140 ft., and a flight of steps at the back rises to about 8 ft. or 10 ft. above the floor level. From the manner in which a band at the other end can be heard at this extreme point, I have no doubt that, with proper construction, the room might be prolonged 100 ft. further with success. So also Exeter Hall might be prolonged without the gallery, to a very considerable extent, with improvement to the effect. Of course, it may be said that side galleries would give the same accommodation without increasing the length. But side galleries are most unsatisfactory places for hearing music. In one hall with which I am very familiar there are long galleries at each side arranged in a slope, front to back, and which take about 1,000 of the audience. But in those galleries the part in which you can hear the effect of band and chorus fairly even is limited: in all the rest of the gallery it is an unsatisfactory strain to hear. Large windows in any position where they can reflect sound are undesirable, and lighting from the roof is generally bad on this account. On the whole, the windows are probably safest high up in the side walls; and concert-rooms being so much more used by night than by day, lighting is not the most important point. One practical difficulty in dealing with a hall on this plan is, of course, the utilisation of the space under the seats at the back, which is too large an area to be thrown away: in towns it would probably become an available source of revenue as shops or in some similar manner; and where the site allows of no approach at the side, the entrance, of course, would be here.

Very large ideas have been afloat lately as to the number of persons who may be accommodated to hear music in one building; and a well-known writer on architecture has made it a charge against us that we are content with getting three or four thousand people into a concert-room, whereas, if the buildings were properly arranged four or five times that number might hear. This idea I believe to be a complete fallacy, and one which those who build such rooms should discourage. It is impossible by any acoustic expedients to secure that music should be intelligibly heard and effectively rendered in rooms beyond certain limits of size. I say *intelligibly* heard, because that, as before hinted, is really the point. You may no doubt group 15,000 or 20,000 people in such a way that they shall all be within sound of the performers, and have a general notion of what is going on, but that is not hearing music. It does not in the least follow that because 500 performers produce a certain effect in a building of a certain size, 2,000 will produce an equal effect in a building of four times the area; for two reasons. The organ can be in some degree adapted to an increased scale of building, because its sounds are produced purely by mechanism, and by a heavier pressure of wind they can be forced up to a proportionate strength. I do not think these huge over-blown music-mills give as much pleasure to the ear as the old quieter instruments; but it must be admitted that they can make themselves heard. But in regard to other instruments and voices, increase of power can only be got by multiplying the numbers, and this is not the same thing at all. With increase of numbers comes decrease of delicacy, accuracy, and precision; and besides a peculiar indistinctness and want of sharpness of effect, better felt than described, as if the outlines of the composition were blurred and uncertain,—the result, I suppose, of the fact that when a thousand or more performers are to sing together they must be so far asunder that their sounds do not strike the ear with that combined and instantaneous effect which can be secured with a smaller number. In the second place, 15,000 or 20,000 people cannot be accommodated within hearing of music at all except in a building having a great cubical capacity in proportion to its area; that is to say, a vast mass of air space between the performers and a great portion of the audience, and sound cannot, by ordinary means, be forced through this space without a liability to be dispersed and disturbed in its passage. This is not, certainly, a very scientific way of putting it, but this is the only way in which I can explain the singular effect of the

music in the Albert Hall as heard in the balcony. You get a part of a phrase, from the violins for instance, distinctly, and the other portion of it seems to go away somewhere else—

"The rest the gods dispersed in empty air."

You do not hear particular instruments come in when they ought, but you find them out when they have got half through a phrase. This singular effect I noticed over and over again the first time I visited the building. This is not "hearing music." I have heard, within a short period, 1,000 performers in the Albert Hall, 500 in Exeter Hall, and 250 in the Liverpool Philharmonic Hall. The 500 produced the greatest effect; but certainly the 250 in the comparatively small room at Liverpool produced more effect than the 1,000 in the large hall, and as to clearness of rendering, in regard to detail, there is absolutely no comparison. I should apologise, perhaps, for going into what may seem purely musical questions; but the corollary from all this is, that great buildings like the Albert Hall are unsuitable for a clear and intelligible rendering of music: and the result would have been far more satisfactory, for this end, if two halls of half the size had been built, and the audience and performers divided between them. It may be possible to enable 10,000 people, or at all events, 8,000, to hear 500 performers satisfactorily; but I do not believe it is possible to enable 20,000 to hear 1,000 with the like result.

We have been considering, so far, the problem of buildings for large combined choral and instrumental performances only. A different class of performance, however, changes the conditions very much. In comparing vocal and instrumental concerts, it must be remembered that voices can be satisfactorily heard in front only; but the greater proportion of instruments can be heard nearly equally well all round; even the wind instruments, which come nearest to the conditions of voices, can be heard as well sideways as frontways for all practical purposes, and can be very fairly heard even when playing away from the listener. For this reason a central position may become the best for the performers in a building intended specially for this class of music. There is a most beautiful and intellectual class of compositions written by the great masters of the art as "chamber music," consisting mostly of music for three, four, or five-stringed instruments. The idea occurred some few years ago of bringing these works within the knowledge of a larger public by that series of performances which has gained such celebrity under the title of "Monday Popular Concerts." These, though in one sense a great success, are given under the most serious disadvantages from the want of suitably planned and constructed room for them. It is absurd to suppose that the same concert-rooms which are suitable for an oratorio performance can be suitable for this fine and delicate class of music. To treat chamber music so is as reasonable as it would be to place a statuette intended for a drawing-room in the centre of a large square. What is wanted in this case is a room where all the audience shall be as near as possible to the performers, and where there should be as little waste air space as possible. In this case the centre of the room is quite the most suitable place for the performers, and a circular building, with concentric ranges of seats and a raised platform in the centre would be probably the best form that could be employed. The seats for the audience to be arranged on the isacoustic curve, the whole building kept low in comparison with its area, and roofed by a dome, with light iron or timber ribs,* and a central light. The inner surface of the dome should be lined with wood panelling, as also the wall above the top row of seats. The central skylight would be the simplest and most natural method of lighting in a case of this kind; but to obviate the echo from a flat surface of glass, I would glaze the inner skylight as a congeries of small circular lights, with convex glass, the convex sides downwards; this would effectually break up and disperse echo; and at night artificial light could be applied within and above the centre of each of these lights. In a building arranged on this plan there would not be more than about 30 ft. above the players at the highest point. The whole of the resonant surfaces, the roof and walls, would be equi-distant from the players, and the sound would impinge on every point at the same moment. The building, as suggested here, would seat 2,000 people, of whom the furthest row would be within 50 ft. of the players. In such a room I believe 2,000 people would be able to hear string quartette music with the effect which the composer intended. This is certainly not the case with St. James's Hall, where these compositions are now played. It is possible that for instrumental music on a larger scale the central arrangement of the players might be found the best in some ways, as bringing a larger number within good hearing distance of the more delicate passages, though the arrangement and placing of the musicians in such a case is a matter of some little difficulty. I was not aware till the other day that this idea had been practically adopted for some time past at M. Pasdeloup's Sunday instrumental concerts in Paris, which are given in a building at other times used as a circus, the orchestra being placed in the centre. The *Athenæum* contains a long communication on orchestral concerts in Paris, in which the writer mentioned this arrangement as realising a very satisfactory effect, and added, "the matter is worthy the consideration of architects who may have to erect new concert-halls"; and though I think the Albert Hall far too large as it stands, to realise the more delicate effects of orchestral playing, it is very possible that if you were to take the amphitheatre portion alone (omitting the boxes), with a lower roof, and place the orchestra in the arena, it might prove an exceedingly satisfactory arrangement for enabling a large number of persons to hear a symphony to advantage. It would be impossible to place the wind-instruments so that they could be equally well heard by every one; but this, I think, would be the only serious difficulty. Of course, this central arrangement in both cases supposes concerts of instrumental music alone, unmixed with singing. We are not much accustomed to this in England; but this is mere matter of fashion, and since the conditions of successful hearing for voices and instruments are so different, it seems better, when large audiences are in question, not to mix them.

* Timber would be preferable for acoustic reasons, as well as for attaching the wood ceiling, though the practical problem of a low wide roof would be more difficult with timber.

RECONSTRUCTION OF THE INTERIOR OF GREENWICH HOSPITAL.

During the last few months very extensive works have been in progress at Greenwich Hospital, a large portion of the interior having been undergoing structural alterations for the purpose of converting it into a Royal Naval College, which is intended to be partially opened to-day for the reception of students.

The portions of the interior which have been reconstructed in order to adapt them to the educational purposes to which they are in future to be devoted, are generally the apartments which, until within the last few years, formed the home of the old naval pensioners. The hospital buildings, as may be generally known, are divided into four blocks, namely, the King Charles and King William blocks, and the Queen Mary and Queen Anne blocks, all of which are included in the alterations which are now almost completed. In designing and carrying out the conversion of the building, the principle of appropriating the several blocks to the separate and distinctive requirements of the college, both educational and domestic, has been mainly kept in view. The King Charles block, which, under the old *régime*, was principally set apart as the sleeping quarters of the old naval veterans, has undergone a complete transformation. The whole of the pensioners' dormitories have been cleared away, the interior walls having, to a great extent, been removed, and the space so formally occupied has been converted into class-rooms for the naval students who will in future occupy them. These several class-rooms, which are very numerous, have all been decorated, and fitted with gas and other conveniences for their intended purpose.

The King William block, which formerly contained the pensioners' dining-room, is intended to be used as mess-rooms for the students, and in order to adapt it to this purpose extensive structural alterations have been made, including the formation of large and commodious kitchens, fitted up with several ranges and other domestic convenience. It is also intended to construct a spacious lecture-room in this block.

The Queen Mary block during the period of the pensioners' residence was mainly used as dormitories, three floors in the building consisting of sleeping apartments, with long corridors along each side. In addition to these dormitories there was a large and commodious day-room in the centre of the block on each floor, fitted, amongst other aids to comfort with huge old English fire-ranges, around which the veterans were in the habit of relating to their friends and others the scenes which they had witnessed in battle, and otherwise interesting their listeners with many a well-spun "yarn." The whole of these apartments have been completely renovated and decorated, and are now in course of being fitted up and furnished as dormitories for the students of the college. This block is now divided from the ground-floor up to the floors above by a new wide and spacious staircase, and the north-east portion will be occupied by the sub-lieutenants, whilst the southern portion will be set apart for the engineer students when the college is fully opened in October next; and the large day-rooms on each floor, already alluded to, have undergone extensive alterations, and are newly decorated and intended to be used as general and mess rooms by the engineer officers and students. The hospital chapel, which is in this block, has also been renovated and cleaned, and will be opened for services as the college chapel.

The Queen Anne block is intended to be formed into spacious apartments for a museum in connexion with the college. The works in this portion of the building have been somewhat heavy. The block formerly contained twenty-four wards for the pensioners, and these have all been cleared away, which has admitted of an exhibition-room of large dimensions being constructed. Amongst other articles which will form portions of the museum in this portion of the reconstructed interior, are the naval models now at South Kensington, which are intended to be removed to the Royal College at Greenwich.

The above are the chief alterations which have been effected in the interior of the hospital in order to render it available for its future purposes as a naval educational establishment, but still further changes in the building are said to have been resolved upon, one of these being the conversion of the celebrated painted gallery into an elegantly finished mess-room for the officers and students of the college.

The whole of the interior, as reconstructed, will be heated with hot-water pipes, this portion of the works having been carried out by Messrs. D. & E. Bailey, of Holborn. The alterations have been designed by Col. Clarke, C.B., Royal Engineer to the Navy and Director of Works, and carried out under his superintendence; Mr. G. Smith being the contractor, and Mr. Loughborough the clerk of works.

NEW GYMNASIUM BUILDINGS AT THE ROYAL NAVAL SCHOOL.

Whilst the works described above have been going forward at the hospital, an extensive new building for the purposes of a gymnasium has likewise been in progress at the Royal Naval School, on the south side of the hospital itself. This structure has also been designed by Col. Clarke, the Director of Works, Mr. G. Smith being the contractor for the new building at the Naval Schools as well as for the alterations at the hospital. The new gymnasium is being erected on the open area between the present Naval School buildings, and its principal north frontage towards the hospital is uniform in architectural design with the school-buildings themselves. The line of elevation of the new building stands 25 ft. backwards of the school frontages. It is 88 ft. in length, and 32 ft. 6 in. in height from the ground-level to the cornice, the cornice itself being 5 ft. 4 in. in height, surmounted by a balustrade, 5 ft. 2 in. high. The total height of the frontage is thus 43 ft. The building is entirely of Portland stone, the basement being rusticated. At each angle of the elevation there are pilasters, with columns running up between the windows. The principal entrance in the centre, which stands forward several feet beyond the general elevation, and which is 5 ft. in width, has an arched recess, supported by two columns on either side, with ornamental capitals. The central portion of the elevation over the main entrance and above the cornice is surmounted by carving, over which is placed the Admiralty arms, with groups of sculpture above the columns on each side. The gymnasium is approached through an ornamental iron gateway at the central entrance, over which are the royal arms. The interior of the front portion of the building will contain boiler-rooms on the basement. The ground-floor will consist of the instructors' rooms, apparatus-

room, lavatories, and dressing-rooms. On the first floor there is a large gallery opening into the gymnasium, and from this gallery a commanding view is obtained of the gymnasium exercises. On each side of the gallery there are several rooms which will be devoted to executive purposes, whilst on the second floor there are several apartments for domestic purposes. The gymnasium itself is at the rear of the building, and the floor is slightly elevated from the ground-level. Its dimensions are 186 ft. in length by 76 ft. in width, the entire area being enclosed by an elliptical roof consisting of eight wrought-iron ribs, springing from the ground-floor line, the span of the ribs being 80 ft. each. The height of the gymnasium from the ground to the centre of the roof is 31 ft., above which there is a continuous light and ventilator. The building is also lighted at the sides by a series of windows. A large quantity of iron is required in the construction of the gymnasium, which is supplied by the Horsley Iron Company, at Tipton, in Staffordshire.

COMMON-WEAL QUERIES.

CURRENTE CALAMO.

WHETHER a Minister of Public Health is not more indispensable than a Public Prosecutor; and whether both should not be qualified professional men?

Whether a medical officer of health ought not to be a practical chemist, that he might be fitted for his obvious duties as a public analyst; and whether his salary should not be such as would properly remunerate his services, and secure his undivided attention to his office?

Whether every local Board surveyor appointed in the future shall not possess the necessary qualifications of a sanitary engineer?

Whether a person adjudicated a bankrupt three times within seven years, and who on each occasion left nothing for his creditors to realise, should be eligible to sit as member of any public Board or company? and if eligible, whether his citizen right should not be suspended for a limited interval?

Whether these or similar restrictions would not have a beneficial effect, and raise the standard of public representation?

Whether the main drainage and recent sewerage works of London have not greatly exhausted the water-bearing strata of the metropolis, and had an injurious effect on all kinds of natural vegetation in the vicinity of its circuit?

Whether the carrying out of our drainage and sewerage works, as also the sinking of the numerous artesian and other deep producing springs, is not the cause of the gradually drying up of many of the ancient celebrated wells of London?

Whether prevention does not render a prognosis and diagnosis unnecessary, and whether it is not in consequence the stepping-stone and basis of individual as well as public health?

Whether it is not a most unwise and dangerous proceeding to lay out a number of new streets converging to one common centre, and whether the danger and the difficulty are not greatly increased where they are made to converge from different angles opposite a bridge, which has already a line of roadway parallel to the river?

Whether Mr. Lowe has not been contemplating for some time what he can get for public purposes from the City companies, and whether he could not be checkmated by the City guilds at once carrying out a reform in the spirit and purpose of their being?

Whether, in constructing a new town or city, or reconstructing an old or a burned-down one, great parallel lines of streets or roadways, running east and west or north and south at suitable distances, would not be the most judicious and practical method of street-planning?

Whether a provision should not be made in every railway and public improvement Act whereby the poor who are dispossessed will be provided for by the erection of new and healthy homes, or an equivalent for their losses?

Whether the erection of a number of new dwellings for those dispossessed, at a distance from the centre of their employment, is in itself a fair equivalent without some other consideration?

Whether it is not judicious and wise to make our gaols and workhouses as self-supporting as possible?

Whether great mechanical skill or great mental genius in itself ought to be the most prized, and whether one is incompatible with the other?

Whether mental thought in every age did not precede mechanical labour and invention?

Whether both are not twins born of the same parent, and should they not be constant and loving helpmates?

Whether it would not be criminal to draw an invidious line of demarcation that could lead to the divorce of mental genius and mechanical skill?

Whether the rapid increase of population is not a serious fact, and whether it is not the duty of the State to look in time and legislate with a view to the future proper housing and sources of sustenance that will be required by our people?

Whether at some future era of the world all insular nations will not perforce be obliged, through reason of self-preservation, to amalgamate, and whether some non-insular ones will not also have to follow suite?

Whether these natural exigences will not be the natural laws through which all races of mankind will be united,—the touch or force of nature making, at last, "the whole world kin"?

Whether, while we are madly exhausting our coal-fields, we are not most unwisely neglecting the generating power that is to be found in water, wind, and electricity?

Whether the water-force of Artesian wells could not have a more useful mechanical application; and whether wind-sails and water-wheels are not still capable of a much higher phase of development?

Whether the combined waste gases of the animal and vegetable kingdom (living and dead matter) in the metropolis, if collected, would not be sufficient to blow up London; and whether this in itself is not a great waste of power that might be partially and beneficially utilised?

Whether the establishment of an inventors' fund by the State, for the purpose of encouraging and rewarding the authors of really useful inventions, schemes, or systems, whereby the nation at large is benefited, would not exceed in value the ordinary applications of rewards through the action of the civil list?

Whether some of the most deserving of our public benefactors are not left to die in poverty, neglected and unrewarded, after expending a lifetime and exhausting their own private fortune in benefiting the commonweal?

Whether the social reformer who saves the lives of thousands by his public labours is not to be more esteemed by mankind than even he who makes "two blades of grass grow where only one grew before"?

Whether each of us could not do a little individually for the improvement of our species and society during our lives, and would not the sum of our collective labours in each generation have the effect of leaving the world at our deaths in a much better position than we found it?

Whether a simple suggestion thrown out casually, and acted upon, has not often led to important results; and whether it may not be possible that a modicum of good to the commonweal will arise from the penning of these queries?

Whether anybody will thank us if this should happen?

THE DECORATION OF ST. PAUL'S.

THE English, as a rule, are not critical. They do not readily detect anomalies in thought, art, or combination; have no notion of *consistency* in matters relating to art; and are, therefore, insensible to the fact, that any set of men are not fit to deliberate and decide upon any subject; and also to the mistakes, absurdities, and incongruities necessarily consequent on appointing incompetent tribunals. They will elect a committee of able men of business, and believe it competent to settle any question under the sun; entrust any important public work to its guidance, about which, probably, not one of its members has the slightest practical knowledge. In ordinary affairs, the chances are, perhaps, about equal, whether a committee, promiscuously chosen, will be right or wrong in its proceedings and determinations; but in matters artistic, we may safely predict that it will do the very opposite of what it ought, for most unfortunately, every Englishman of fair education has of late got the conceit that he is competent to decide in matters of taste; and the country, under this state of things, may indeed consider itself fortunate, if any great public work, requiring consummate artistic knowledge to direct, be brought to a consistent and glorious completion. In any other country common sense would dictate that the initiative in such undertakings should be entrusted to a body of men, a committee, thoroughly conversant with art.

The first thing to be considered in reference to the completion of St. Paul's is, what were Wren's views respecting it? His views are often confidently spoken of as if they had been embodied in some precise testamentary declaration. If this really be the case, where was the necessity for supplementing Mr. Penrose, who had so long been the cathedral surveyor? But we never could believe that Wren was competent to determine, other than very vaguely, what the decorations of St. Paul's should be, and we are fully confirmed in this belief by Mr. Wyatt Papworth's letters to the editor of the *Times*. There was no sufficient art education in Wren's time, to enable him to form a just and definite conception respecting them. Nor were there then painters, in England at least, able to carry out his views, had they been correct. The ornamental carvings of Gibbons, whatever their special merits may be, are not in a style strictly appropriate to the architecture. His employment on these embellishments was, doubtless, a necessity imposed by the dearth of choice. Wren's towers, with Renaissance clock faces, at Westminster, clearly show that he had no nice and varied discriminating taste. And yet what is there that has been said in reference to Mr. Burges's appointment, which could not have been said with equal or greater force in favour of Wren being competent to *complete* the towerless abbey? But there the towers stand, as monuments of his incapacity to deal with a style to which he had not been to the manner bred and born. The word "*circumspice*," in the inscription in St. Paul's, may have been qualifying, not meant to extend as far as Westminster. In truth, a man who has, by circumstance and inclination, been long bent to a particular kind of art, cannot divest himself of a deeply ingrained bias. The idiosyncrasy will, imperceptibly to the artist, crop up just as it did with Wren at Westminster, and Mr. Burges at Worcester College.

The public appears quite to have forgotten that a Royal Commission* was appointed some thirty years since to collect every available information with reference to the proper mode of conducting great mural works, and the best qualified painter of the time was its chosen secretary. From the various reports published by this Commission, we may gather that when the great buildings in Italy, or more recently in Munich, were completed, the ablest mural painters were called in to decide the iconography and scheme of decoration as regards design and colour; the architect thenceforth only interfering should any architectonic anomalies occasionally present themselves when the designs were inspected, or by furnishing the minor ornamental decorations. The supposed necessity for supplementing Mr. Penrose doubtless arose in ignorance of the separate and special functions of artist and architect in conducting a great edifice to "completion." The time had arrived to call in the painters, not another architect, to determine the iconography, style of design, and scheme of colour. One architect, and that one as fully acquainted with Wren's views as any one is likely to be, would have been, unaided, sufficient for the duties properly devolving upon him at this juncture.

But if what has been done is irrevocable, every precaution must now be taken to guard against a probable Gothic bias in the newly-appointed architect. In this we have no doubt Mr. Burges would concur, and be ready to take to his counsel the best-qualified artists and technical advisers. This, at least, is all that we can now hope for. We fully believe in Mr. Burges's special aptitudes, but if he is to succeed in this undertaking he must, like the great masters of the Renaissance, put aside his leanings to the Giottesque in mural art, which is essentially Gothic, and unfitted for the massive Renaissance architecture. This brings us at once in view of the rock ahead, on which our would-be decorators of St. Paul's are ignorantly and perversely steering. The early Italian style of painting is to their untutored art-mind the true ecclesiastical style, whereas it was only a step in the development of the school. It is Gothic in its leanings, and would be totally unfit for and out of place in St. Paul's Cathedral. The great change in Raffaelle's style of design

* Correspondents of the *Builder* have, *on several occasions*, called attention to this fact.

has often been noticed, but the reason for it has nowhere, to our knowledge, been given. Raffaelle's style, till he became engaged on the great mural works in the Vatican, was, though superior to that of his master and other earlier Italian painters, Gothic in its bias. But as soon as he was brought within the influence of the Revival, of Grecian and Roman antiquities, and was called upon to adorn with his pencil the massive architecture of the Renaissance, he saw that larger forms and a greater boldness of treatment in design would be required to bring his painting into harmony, into unison, with the architecture. Michelangelo had made some ineffective attempts on the ceiling of the Sistine Chapel before he perfectly understood what was required in method of treatment for such an edifice, though he had long previously intuitively felt that a large and grand style of design would be necessary to bring painting and sculpture into harmony with the then prevailing fashion in architecture. It would be far better to leave the grand old cathedral in its smoky and bold grandeur than to deliver it over to our self-styled ecclesiastical decorators, designers of Gothic windows and contorted saints. Two of the greatest absurdities amongst the various items proposed for the "completion" are the insertion of pictures on glass in the windows, as these must inevitably be fatal to the effect of any mural paintings which may be hereafter executed, and the proposed extensive use of Tricquetti's marble inlayings, which, however appropriate to certain other conditions, would in St. Paul's be quite ineffective, and in a brief space of time undistinguishable from plain surfaces.

Let Mr. Burges leave the iconography and mural painting to the painters: he will find his proper vocation in purely architectural matters; in the restorations and subsidiary decorations. And we learn from a reliable source that there are many restorations and repairs needed, which are thus enumerated:—"considerable regilding, replacing of rails, especially those encircling the churchyard, and guarding some of the cracked geometrical pavement; the replacing of festoons that have wholly disappeared." There is no remedy, we are afraid, for the sinking of the piers. So long ago as 1803, a Commission reported that "in certain places they had subsided from 4 in. to 5 in., the dome subsiding with them; that the stones supporting one huge arch had yawned nearly 1½ in., that there were deep indentations in the exterior pillars, caused by rain, and forming channels for it, that the mortar was crumbling out; and that a sad degree of corrosion was in progress. No doubt efforts have from time to time been made to arrest this decay, but all in a partial and perfunctory manner." There is another source of injury not apparently to be reached,—the inherent dampness of the walls. Possibly modern invention may discover a cure for it. We must, however, ourselves protest against the finicking use, the picking in, of mouldings with gold, as recently done. This is suited to palaces, theatres, ball-rooms, &c., but utterly unsuited to a grand style of ecclesiastical decoration.

There is another alteration practicable, and absolutely required, which has been referred to by several writers on this subject, viz., the removal of all those sculptured memorials which have been injudiciously incorporated with the edifice: detached statues and groups may, perhaps, be permitted to remain yet some time longer or in perpetuity. The completion of St. Paul's may, perhaps, more forcibly bring to our minds the necessity there is for an English Walhalla in order to relieve St. Paul's and the Abbey of many monuments, which to improved taste in these matters have become eyesores. And, in conclusion, we venture to express a hope that only a small amount of colour, certainly not pictures on glass, be admitted in the windows, and that the field will chiefly be of "grisaille."

C. B.

Landslip at Oswaldkirk.—For something like twelve months past, on the south-western slope of the Hambleton range of hills in North Yorkshire, has been witnessed the phenomenon of about 10 acres of grass land, comprising portions of five or six fields, gradually and with irresistible force gliding from its original position into the plain beneath, confusing and interfering with old "rights of property," in the most reckless manner. Other landslips in the locality have taken place, but they were small in comparison. Even a road has been cut into two by the process.

ON CORBELS, CONSOLES, AND BRACKETS.

What is a corbel in architecture, and in what particular is it distinguished from a bracket or console? What is its true origin, and how far has the term been altered in the practice of modern building? Is a *bond fide* corbel the emanation of Gothic or Classic architecture? Can a corbel exist without projections, and does it constitute a corbel when it springs from within the face of a wall, or when it is merely affixed? These are questions I would like to put to architects and builders in general, for my own information, as well as for the satisfaction of those who ought to feel interested.

One of our "standard dictionaries" thus defines the term:—

"Corbel, *s.* In architecture, the representation of a basket, sometimes set on the heads of caryatides; the base of a tambour of the Corinthian column, so called from its resemblance to a basket. A short piece of timber, iron, &c., in a wall, jutting 6 in. or 8 in. in the manner of a shoulder-piece; a niche left in walls for images, figures, or statues."

The building workman must have a rather clear head if he would not be puzzled by the above description. I will now quote the description given in a recently-published encyclopædia:—

"Corbel (Ang.-Norm.), in architecture, the name given to blocks of stone projecting from the surface of a wall, to support the machicolations of towers, or the ends of the beams of the floors in old castles. The beams which form what is called an open roof in churches and large halls are often supported on carved corbels. The stones which support the bartizans at the angles of a tower, jutting out in layers one above another, are also called corbel stones, and stones which project in this manner are spoken of as 'corbelling out.'"

The standard dictionary authority gives the pronunciation as *kawr'-bel*; while the encyclopædia puts it down as *kor'-bel*.

Let us take what is looked upon as a better authority than either. In Parker's "Glossary of Terms" we have it thus,—"Corbel (Lat. *corbis*, a basket), a term denoting a projecting stone or piece of timber which supports a superincumbent weight. Corbels are used in a great variety of situations, and are carved and moulded in various ways, according to the taste of the age in which they are executed. The form of a head was frequently given to them in each of the styles, from the Norman to the Late Perpendicular, especially when used under the ends of the weather mouldings of doors and windows, and in other situations. Sometimes, also, masks were introduced." The above definition, on the score of technical description, is, indeed, infinitely better than the preceding ones. The same authority thus describes a console,—"*Console* is strictly the French term for a bracket, or for the *ancones*; but it is commonly used by English authorities also for a bracket or corbel of any kind in Classical architecture." Well, the same author describes a bracket as "an ornamental projection from the face of a wall to support a statue, &c. They are sometimes nearly plain, or ornamented only with mouldings; but are generally carved either into heads, foliage, angels, or animals. Brackets are very frequently found on the walls in the inside of churches, especially at the east end of the chancel and aisles, where they supported statues which were placed near the altars." I may ask here, then, what is a boss? It is also used as the termination of weather mouldings, and in all senses it may be said to be a projection. When it ends a drip-stone is it not called a corbel? Brackets and consoles are used in some cases as trusses. Then are brackets and consoles convertible terms? Brackets in some of our Gothic cathedrals,—for instance, York,—are both beautifully foliated as well as moulded, and spring from, or are supported by, an image. The best examples, I believe, are let into the pillars, columns, or walls, where they are seen and are not affixed; therefore they partake, in these cases I should say, more of a corbel than a bracket, although not intended for the ordinary application of the corbel. There is a beautiful specimen of a corbel in Wells Cathedral, used in the springing and supporting position that ecclesiastical corbels were generally used in in connexion with roofs, not floors.

Chantry altars, in some of our ancient Gothic churches, are supported on "brackets or trusses built into or projecting from the wall." (See Bloxham's "Gothic Architecture.") In other instances these altars were partly supported on brackets, and partly sustained on shafts or slender piers. Now if these brackets were let into the wall, and had their usual projection, were they not corbels *per se*, instead of brackets or trusses? We have some instances, I believe, of double and even triple bell-cots corbelled out from the gable end of our Mediæval churches. These constructions have been called by different names, such as bell-gables, bell-turrets, or bell-cots. When these erections occurred on the apex of the eastern end of the roof of the nave, they were intended for the Sancte bell. Numerous instances could be adduced to show to what extent the system of corbelling was carried out in the exigencies, or in pursuance of the waywardness, of Gothic architects and builders, but it has been left to our times to corrupt and confound, and mix up and muddle the distinct and beautiful terms once used for a specific purpose. We have been told within the last few days by a builder who was giving his evidence in the case of an accident, that "the corbels were flush with the walls." I shall not be surprised in the least if in the next edition of our standard dictionaries or technical manuals our building workmen are informed that a corbel is the name of "any piece of stone, timber, or iron, let in flush with the wall to support a beam or other superincumbent weight."

Notwithstanding the establishment of our school-boards, I greatly fear that the schoolmaster will be a long time abroad.

A Craftsman.

THE CAMBERWELL NEW INFIRMARY.

A large and costly block of buildings, erected by the Camberwell parochial authorities, as an infirmary for the parish, at an outlay of 20,000*l.*, has been in progress during the past twelve months, and is now so far completed that the dispensary and medical staff portion of the building has been opened; but it will be some months before the structure is ready for the reception of patients, for 300 of whom there will be accommodation in the several wards. The building is situated in Havill-street, within a short distance of the new vestry-hall, at the corner of that street and Peckham-road, and which is also now covered in.

The internal arrangements of the building are being carried out upon the most ample scale, the large space within the interior admitting of this being effected. The portion just now opened consists of the basement, which contains the dispensary and rooms and apartments directly with it, including the medical men's consulting-rooms, patients' waiting-room, and drug-room in the front portion, which is divided from the rear of the basement by a spacious corridor, 7 ft. in width. The basement rear beyond the corridor contains the domestic offices, which consist of laundry, kitchens, beer and wine cellars, wash-house, and engine-house and boiler.

The structure itself forms a large square block, covering an area of 1,900 square yards, and an area enclosed by the main frontage and wings of the building give to it within the character of a quadrangle. The main frontage in Havill-street is 150 ft. in length, consisting of a prominent centre and two wings, the latter at the side elevations extending backwards 110 ft. The central portion of the Havill-street elevation is 80 ft. high to the top of the cornice, the wings being 70 ft. in height. In addition to the basement and ground-floor, there are four lofty stories in the central elevation, and three stories in the sides or wings. The elevation is comparatively plain. The prevailing materials used are white bricks, with a free admixture of red brick, and stone dressings. The windows have stone springers and keystones. Between the window-heads and sills of each story there are bands in red brick, filled in with encaustic tiles, carried across the entire elevation; the cornice at the extreme height of the elevation is of red brick. In the central portion of the elevation is a stone baleony, projecting from the top of the first story, above which a lofty window, in Bath stone, with red brick arched headings, and stone springers and keystones, is carried up to the top of third story. The windows in the upper part of the central elevation form also a prominent feature. They are carried much higher than the two side portions of the frontage, and contain nine clustered windows, the whole being surmounted by a gable. The whole of the windows in the elevation, with the exception of those just named, are in three bays. The principal entrance, which is immediately under the large

central window, has on each side carved stone piers, surmounted by a stone carved archway.

The ground-floor of the central portion of the elevation contains the house-surgeon's sitting-room, and also the matron's sitting-room, both in front of the building, the one on the right and the other on the left of the principal entrance. A wide corridor divides this portion of the ground-floor from the rear, and this corridor leads to the house-surgeon's bedroom, lavatories, stores, and other offices. The first floor contains the matron's bedroom, the nurses' day-room, nurses' kitchen, stores, and nurses' dormitories. The second and third floors are reserved as special wards, whilst the fourth story in the centre of the building beneath the gable will be exclusively set apart as servants' dormitories. The whole of both wings, inclusive of both the ground-floor, and first, second, and third stories, are being fitted up exclusively as patients' wards, the female wards being in the south wing, whilst the male wards are in the north wing; these several wards having accommodation for 168 patients, and with the special wards in the central portion of the building, there will be accommodation for 300 patients. The arrangements for conveying patients to any part of the building are on a scale of unusual completeness. In the corridor opposite to the principal entrance there are two lifts connected from the ground-floor with the top of the building, by one of which patients can be conveyed to and from any of the wards in the several parts of the building, and the other is a dinner-lift. In addition to the space occupied by the building itself, there are extensive recreation-grounds for the patients attached, upwards of 1,000 square yards in extent, the entire area of the Infirmary and grounds being upwards of half an acre.

Mr. W. S. Cross is the architect, and the contractor is Mr. Hart, of Southwark.

THE PRESERVATION OF ANCIENT MONUMENTS.

AT the last meeting of the Anthropological Institute, Sir John Lubbock said, in reference to the Bill he was about to introduce in the House of Commons for the preservation of historical monuments and antiquarian relics, that it had already received the support of the most eminent archæologists. The great difficulty in dealing with monuments was that it interfered with what are called "private rights"; but we might attain our object by scheduling those monuments which appear most worthy of preservation, and give notice to their owners, thus preventing them from being wilfully destroyed. Some efforts had been made by our representatives abroad to induce the Turkish Government to take steps for the preservation of monuments in its territories, and he did not see how we could ask foreign Governments to exert themselves to preserve their monuments when we did not take the trouble to preserve our own. Near to Marlborough, until recently, there existed three dolmens, one of them being destroyed simply in order to repair the roads with the stone, and the second had entirely disappeared.

Mr. Franks said that the Dutch Government were fully alive to the necessity of preserving these monuments, every year a certain number being purchased by the State. Out of fifty-four megalithic monuments in one province, fifty-one had been thus purchased for the country.

Mr. Conway asked if the Dutch Government found much difficulty in inspecting or in guarding them; because, if so, sooner than have these monuments under inspection, the farmers would destroy them, and the result would be, probably, a general devastation.

Mr. Franks stated that, in the case of Holland, a map was made out, with every monument marked thereon.

Mr. Howard said that in Wales there were a great number of dolmens scattered over the coast. The farmers did not object to them, but to antiquaries trespassing on their lands.

Mr. Dawkins said there were a great many monolithic monuments in the Isle of Man, and that, owing to the force of popular superstition, they had been hitherto remarkably well preserved. *Unfortunately*, however, for the monuments, the superstition was disappearing before the spread of education, and it was to be feared that many of these ancient remains would be destroyed unless something were done to secure their preservation. Some years ago a party of antiquaries had the boldness to examine a sepulchral chamber under one of these monuments, near to St. John's Church, where the Tynwald is situated. They had meddled with human bones; and the farmer on whose ground the monument stood, killed a heifer, and burnt it, as a propitiatory sacrifice, lest the sacrilege should lead to some evil results to himself.

In answer to Dr. Hyde Clark, Sir John Lubbock said that no information had been received from the Foreign Office relative to what had been done in other countries as regards the preservation of historical monuments.

THE LATE MR. SLATER, ARCHITECT.

WILLIAM SLATER, who died on December 17th, in his fifty-fourth year, was a son of the late Mr. Slater, of Daselbeech, Northants; his early years were spent in his native county, and when sixteen years old he came to London, and was articled to the late R. C. Carpenter, and thus, from the first, began the intimate friendship which, up to the death of Mr. Carpenter, existed between them.

In the early days of the Gothic Revival they worked together with enthusiasm in the preparation of some of Mr. Carpenter's earlier designs, as St. Stephen's, Birmingham; St. Paul's, Brighton; St. Patrick's Cathedral restoration, Dublin; Cookham Dean Church; Campden House, &c.; and he thus acquired that love for, and appreciation of, English Gothic, which remained with him when various fashions of foreign Gothic in after years distracted many leading architects. Besides assisting in these works, Mr. Slater helped Mr. Carpenter in his district of St. Luke, Old-street, and also in the district of Islington.

During many years Mr. Slater lived in Mr. Carpenter's house, in Guildford-street and Upper Bedford-place, and the greatest intimacy existed between him and Mr. Carpenter's family, to whom his kind and affectionate nature very much endeared him, and by Mr. Carpenter himself, also, he was held in the greatest esteem and confidence.

For a short time before Mr. Carpenter's death Mr. Slater took an office in the Adelphi, with his old friend and fellow-pupil, Mr. William Smith, and commenced his first works, the restoration of Weldon, Islip, and Stanwick churches, and a new parsonage at East Haddon, and with Mr. Smith erected a new town-hall at Loughborough.

When Mr. Carpenter died, in 1855, he was advised by some of the oldest friends and clients of Mr. Carpenter, such as Mr. Beresford Hope, Canon Woodard, the Rev. B. Webb, the Rev. E. Tower, and others, to return to his late friend's office, and undertake his engagements, both in his own interest and for the benefit of Mr. Carpenter's widow, and the future advantage of his son. Mr. Slater accordingly took his place, and resumed the works left incomplete, such as Bedgebury Park, Lancing and Hurstpierpoint Colleges, Earl's Shilton and Sompting Churches, &c.; and he was appointed to succeed Mr. Carpenter as architect to Chichester Cathedral, and architect for the restoration of Sherborne Abbey choir. He also carried out at this time new buildings for the King's School, and St. John's Almshouses, Sherborne, and many church restorations and other buildings in the neighbourhood, for Mr. G. D. W. Digby.

In his native county Mr. Slater restored very many churches; amongst which were Higham-Ferrers, Kingsthorpe, Finedon, Easton-Mandit, and Woodford; and, with Mr. Smith, the grand old church of Brixworth. Many churches for the Duke of Buccleuch were restored under his care, and many other churches in different parts of England, such as St. John's, Devizes; St. Leonard's, Bridgenorth; and Etchingham, Wadhurst, Burwash, Deerhurst, Ditchling, Rustington, Alcomb, and Goudhurst churches. He erected new churches at Edinburgh, Belfast, Bray, Dunkeld, St. Kitt's, Devizes, and Mogger-hanger, as well as the new Cathedral of Kilmore, Ireland, and restored Limerick Cathedral. Houses were erected by him at the High Beeches, for Mr. Loder, one for the Dean of Kilmore, besides many parsonages and schools, including the large school of St. John, in St. Pancras parish.

The restoration of the choir of Chichester Cathedral was commenced under Mr. Slater's care; and in conjunction with Sir Gilbert Scott he carried out the reconstruction of its tower and spire; and with Professor Lewis he restored the grand Priory Church of St. Bartholomew the Great, in Smithfield. During these and the subsequent years his friend, Mr. Ingelow, was in his office, and assisted him greatly in these various works.

In 1863 Mr. R. Herbert Carpenter, having been articled to him, became his partner, and up to the day of his death they worked together in the most perfect friendship. Under their direction the restoration of Chichester choir was completed. Hurstpierpoint Chapel, and new churches at Bootle, Outrington, Dumfries, Belfast, Church-Lawford, Southend, Milton, Burwash-Weald, &c., were erected, and the new cathedral of Honolulu commenced; and restorations carried out at many churches, such as Calne, Bruton, Middleton, Thornford, Thurnby, Henfield, Tortworth, Burton-Latimer, Earl's Barton, Strixton, Amport, Hemington, Tisbury, Bywell, Stapleton, Stapleford, &c.; also the restoration of Brigstock Manor House, for the Duke of Buccleuch, Holdenby House, and the Bishop's palace at Chichester. They also erected Lord Salisbury's new mansion in Arlington-street; the mansion at Seacox-heath, for the Right Hon. G. J. Goschen, M.P.; the new colleges of St. Chad, Denstone, and St. Saviour, Ardingly, and the new buildings of St. Nicholas College, Lancing (the chapel of which is yet in course of erection); the King's School buildings, Sherborne, and works at Cheam School, Surrey. Amongst the works which are still being carried on by Mr. Carpenter are the new church and schools of St. Mary the Virgin, Soho; the new church of St. Michael, Enfield; the completion of St. Paul's, Brighton; and the last work on which Mr. Slater was engaged, even on the day of his death, the new chancel and apse of St. Mark's, Myddelton-square, where he had been churchwarden for twenty years.

His character may be summed up in a few words. He was a man of rare simplicity and nobility of mind. Earnest, indefatigable, and zealous in all which he undertook, trouble was what he never cared for in perfecting work which he had undertaken; while the stores of knowledge on which he drew were alike extensive and accurate, and his natural good taste saved him from the snare of that overstrained attempt after eccentric originality in which architects even of high authority are sometimes prone to indulge. His private life was marked by the depth of his religious convictions, and by the kindliness and cheerfulness of a thoroughly sweet disposition.

STREET SUBWAYS.

PARLIAMENTARY powers for the construction of sub-aqueous communications in London have been obtained with little difficulty; and the Tower Subway is evidence that, with modern mechanical and engineering appliances, such communications can be opened in a space of time, and at a cost, marvellously small, as contrasted with the time occupied and the money expended in the construction of Brunel's first celebrated and unfortunate Thames Tunnel. Notwithstanding these circumstances, the powers given to construct subways under the Thames do not seem to lead to rapid and assured successes. The Tower Subway Company have failed to carry out their original design of conveying passengers by steam power between the Middlesex and Surrey sides of the river. The steam engines for raising and lowering the hoists, and for drawing the omnibus through the subway, have been removed long since from the bottom of the shafts; the iron chambers in which the passengers ascended and descended, and the iron omnibus, have long since been taken to pieces and cleared away; and now passengers pay simply a toll of a halfpenny each, ascend and descend the shafts by commonplace stairs, and make their way, with as little bumping as possible, through the 7-ft. tube.

Concerning the other subways under the Thames, for the construction of which Acts have been obtained in former sessions of Parliament, —the City and Southwark, and the Temple subways—nothing is now heard.

There is another use to which subways may be applied in London that it seems strange should escape the attention of the Metropolitan Board of Works and the Corporation of the City of London. We refer to their provision as a means of avoiding the dangers of a number of our most perilous street-crossings. The moot point, subways *versus* bridges, has been discussed very fully, and the discussion has been carried over many years; but passengers continue to be run down in the public streets, the crossings become more crowded and dangerous daily, and

no remedy is applied. How long are the passengers that have to cross daily or occasionally at the Mansion House, at the bottom of Ludgate-hill, and other dangerous places, to have to do so with paralysing fear? How many more victims are to be crushed to death, or maimed, and injured for life by the Juggernaut of our streets before the authorities provide an ægis? It is simply a question of time, and of the extent of sacrifice that must be made; sooner or later footways under or over the carriage ways *must* be provided at numerous crossings, and the sooner a beginning is made the better. With many persons it will be quite a minor consideration whether they have to ascend 20 ft. to get to the top of a foot-bridge, or to descend 10 ft. to get into a subway: the paramount consideration is, *any* means of getting across rather than by threading a way among the vehicles. The Ludgate-circus, in course of formation, furnishes pressing claims for some such safe provision for foot-crossing. The safest part of that crossing is, curiously, that at which it is most gorged with traffic, namely, the corner at which the old building remains as yet undisturbed, and where the stream of vehicles has to be crossed at a simple right angle. In other portions of the crossing, vehicles of all kinds, driven at all speeds, taking all kinds of angles and curves, have to be met, and Scylla can only be avoided at the imminent risk of encountering Charybdis. Only the other day a serious accident befell a well-known literary man at this place. His brain and spine were seriously injured, and his arm put out of joint. Leaving behind in the mud a packet of valuable manuscript, he was carried away unconscious to St. Bartholomew's Hospital, and thence to his own residence, his useful labours suspended for an indefinite time. The police force told off to regulate the traffic at this crossing may have been reinforced, but some more certainly trustworthy safeguard than this is imperatively demanded.

Glasgow Subway.—One of the private Bills of the session is for a subway under the river Clyde, commencing on the north side of the river and harbour of the city of Glasgow, at or near Anderson Quay, and terminating on the south side of the river, at or near the east end of Springfield Quay, in the parish of Govan; the capital of the company, in shares and loans, to be 33,000*l.*, and the works to be completed in five years. The proposed toll is to be one penny per foot-passenger.

THE PROPOSED NATURAL HISTORY MUSEUM, KENSINGTON.

Sir,—I shall be glad if you can allow me space in your periodical to correct an error which has crept into the notice which appeared in the *Builder* of Jan. 4, 1873, concerning the proposed Natural History Museum at Kensington, and which, if unexplained, would leave a very wrong impression of the work of the late Captain Fowke, Royal Engineers, with respect to that building.

It is therein stated that, "as so often happens with designs which are the result of competition, it was found that much of the ingenuity which had been displayed in this design (Captain Fowke's) had been thrown away in consequence of the arrangements being incompatible with the absolute requirements of the authorities; and that to meet those requirements it was impossible to retain any large portion of it." This, I think it will be allowed, is calculated to convey the idea that Captain Fowke had paid so little attention to the conditions laid down for the guidance of the competing architects that his design, to which the appointed judges awarded the prize, had to be virtually abandoned on subsequent examination by the "authorities," whoever they were.

Those conditions, which were laid down by the trustees of the British Museum, were printed at the time; and I think it will be found on reference to them that Captain Fowke's design, as originallly approved by the judges, provided for them completely. So fully was his design criticised in this respect by the authorities of the museum, that observations in detail upon it were made at the time for the consideration of the judges or of the Government. These criticisms, which, on the whole, appear to have been favourable to Captain Fowke's design, were replied to by him on the points on which objections were made to it, and he showed in these replies how fully he had provided for the official requirements. Other objections there were to his arrangements, but they were upon matters open to discussion, and upon which Captain Fowke's opinion was at least as valuable as those of his critics.

After his plan was accepted, it is well known that he had frequent consultations with Professor Owen on the subject, by whose advice he may have made some modifications in his original design. But the best proof of the correctness of his own views with respect to the general arrangement of the galleries is, that after these ten years of delay, Mr. Waterhouse has virtually adopted them, as shown in the plan of his design in your paper of the 11th. And as regards floor space, Captain Fowke's ground-floor contained nearly double the area of Mr. Waterhouse's.

The extract from your paper to which I have taken exception must also be considered, I think, to imply that in the writer's opinion Captain Fowke's design had the fault of crudity common to many competitive plans. But considering his large previous experience in the arrangements of exhibitions and museums, and his known specialty in that line of architecture, I should hope that such an implication could not have been really intended.

The question of the general merits of Mr. Waterhouse's plan, as compared with Captain Fowke's, would lead me far beyond the object of my letter, which is to clear his memory from the imputation of a want of careful thought in the preparation of his design. As, however, the course pursued by the Government with respect to this building leads one to the consideration of the general question of the best mode of obtaining designs for our public buildings, perhaps you will allow me to recur to the subject on another occasion.

T. B. Collinson, Colonel,
Royal Engineers.

CHAMBERS OF COMMERCE AND RAILWAYS.

At the approaching annual meeting of the Association of Chambers of Commerce important propositions are to be discussed in relation to railway amalgamation, management, and improved communication. It will be proposed that the report from the Joint Select Committee of the House of Lords and the House of Commons on railway companies' amalgamation be considered, and that a deputation from the Association be sent to the Government, to support, or otherwise, all or any of the recommendations of the Committee; also, that a deputation from the Association of Chambers of Commerce wait upon the President of the Board of Trade and the Home Secretary, and urge upon the Government the desirability of an inquiry by Commission or Select Committee into the question of railway management, with reference to the convenience and comfort of passengers, and the diminution of the number of accidents, both to passengers and railway servants. The inhabitants of Southampton have for a long time past been greatly dissatisfied with the insufficiency of their means of communication by railway with other localities, and maintain that this circumstance has greatly impaired the prosperity of the port. The Southampton Chamber sends the following proposition for consideration by the Association:—

"That it is of paramount importance to the commercial and manufacturing interests of the kingdom that additional railways between the northern districts and the southern ports should be sanctioned by Parliament."

The proposed Swindon, Marlborough, and Andover line is a project of the present session that comes within the scope of the resolution.

ENGLISH ARTIZANS FOR ATHENS.

Mr. Watson, our representative in Athens, in a recent official return, says, he has been informed by several persons resident, in whose judgment he places reliance, that there now exists an opening in Athens for a limited number of skilled British artizans. He has consulted on the subject with various persons established, and with several employers of workmen, and these have replied to his inquiries:—"Do not discourage English artizans from coming to Athens. Steady skilled men might make their way here very well." The demand, however, for English labour would seem to be only for men skilled in making, managing, or repairing machinery, and for locksmiths, bell-hangers, house-decorators, sign-painters, and cabinetmakers. As to the quality of workmanship in Athens, the inconvenience, expense, trouble, and, in fact, the impossibility of getting any repairs done to houses at the worst season of the year are very harassing to the occupant, with respect to locks, door-handles, varnishing, &c.; and in Athenian rooms their condition is utterly disgraceful. As a means of obtaining furniture the possessor of empty rooms has to purchase at sales—when these occur, such articles as may be presented, without regard to his taste or to their corresponding with each other. The German cabinetmaker is often unable to execute an order under months. Such being the state of things, it would be a boon to the more civilised portion of the community if some English artizans, of the crafts indicated, could be made to see their way to emigrate to Athens with profit to themselves, as in that case some of the blanks in the skilled labour market would probably be gradually filled up; besides, were a better quality of skilled labour introduced into Greece, it might be hoped that a taste for better workmanship would thus be, ere long, created amongst the Greeks: above all things, however, they must be temperate.

NEW POST-OFFICE, ST. MARTIN'S-LE-GRAND.

The new Post-office building at St. Martin's-le-Grand, erected from the designs and under the superintendence of Mr. James Williams, of H.M. Office of Works and Public Buildings, is rapidly approaching completion. We publish in our present number a view of the exterior and plan of the ground-floor. In another issue we shall give a plan of the upper story. The building is rectangular, having frontages of 286 ft. to St. Martin's-le-Grand and Bath-street, and frontages of 144 ft. to Newgate-street and Angel-street, and is 84 ft. in height from the paving line. It stands on a base of granite from the De Lank quarries, and the whole of the fronts have been executed in Portland stone of the hardest "Whitbed." The building is four stories in height, exclusive of the basement, and the floors will be thus appropriated:—The basement will be partly occupied as office-rooms, partly for stores, and partly by the department of the telegraph engineers, the large room in the centre being used as a battery-room. The ground-floor will be occupied by the Postmaster-General and the Accountant-General. On the first floor will be accommodated the secretaries and their staff; the third and fourth floors being appropriated to the telegraph department. The fourth floor will be especially devoted to the telegraph instruments and the pneumatic tubes will be laid on to it, establishing communication with the district offices. The large instrument-room is 125 ft. by 80 ft.

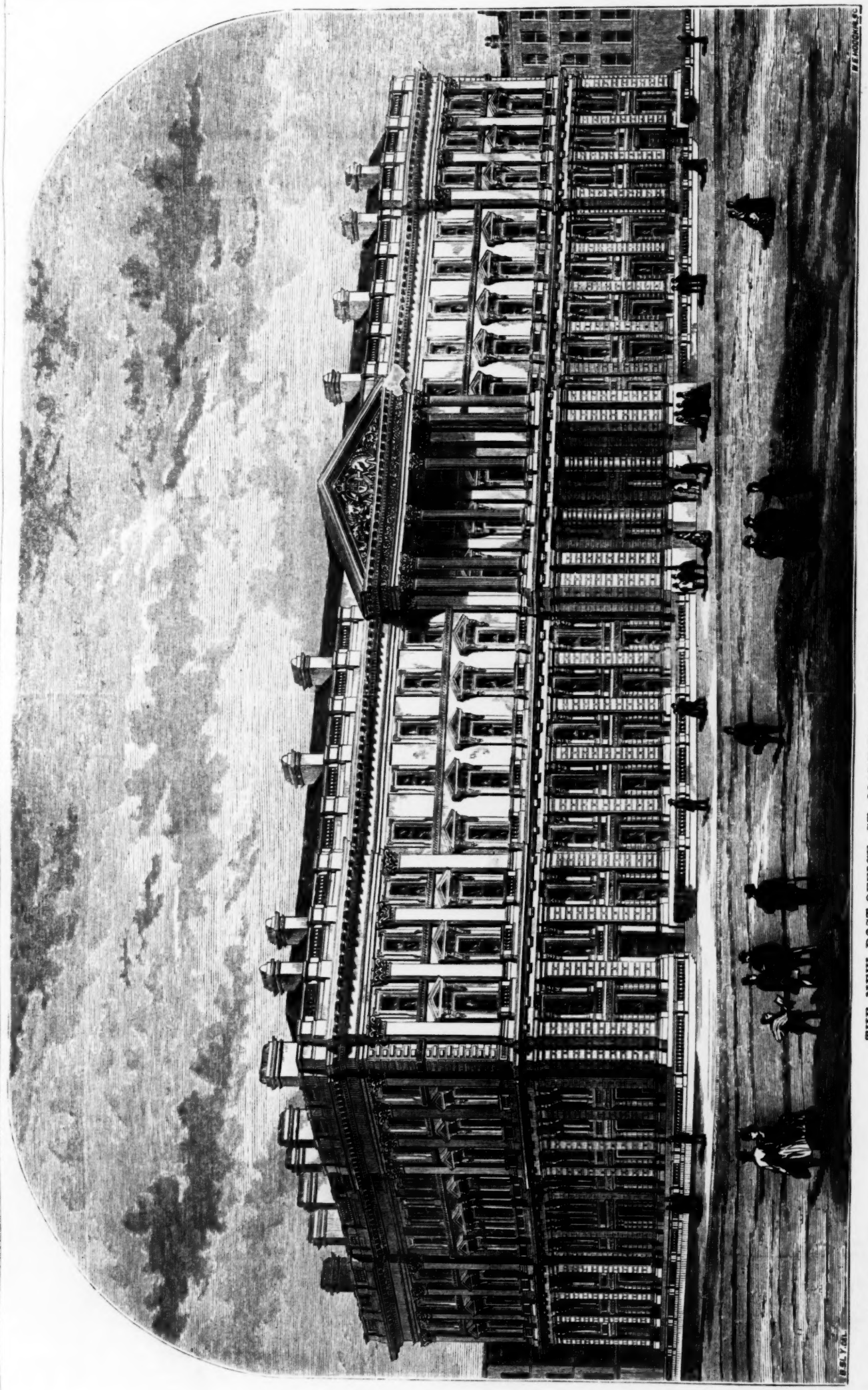
It was originally intended to provide a Public Office on the ground-floor of the building, and a central hall was accordingly constructed. It is now, however, found necessary to abandon this scheme, and the central hall will be occupied by the staff of the Accountant-General.

In the north court there will be placed four steam-engines, each of 50-horse power, for working the pneumatic tubes, and the works are in hand in the south court to provide for the boilers. These comprise a large boiler-house, and a chimney about 20 ft. higher than the main building. An Artesian well is also proposed for the supply of the large quantity of water required, and a small engine will be kept at work at pumping to the large tanks (two of 6,000 gallons each), at the top of the building.

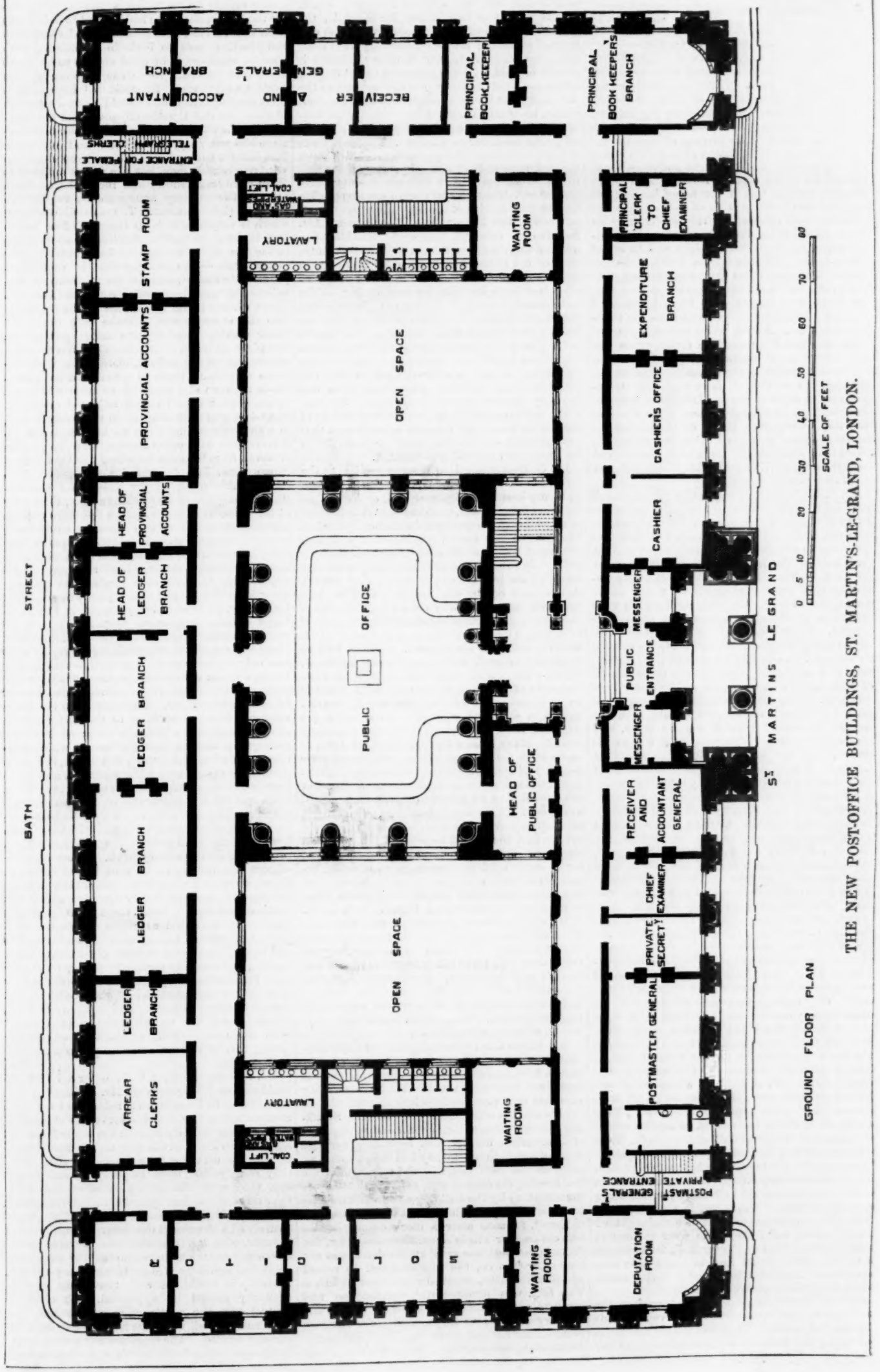
The plastering is now for the most part completed, with the exception of the central hall; much of the joinery fixed; and the special fittings commenced. It is calculated that about three-quarters of a mile of instrument-tables will be required in the telegraph-galleries.

The building was commenced in December, 1869, the first block of Portland stone being laid by the Right Hon. A. S. Ayrton, M.P., the First Commissioner of Works, on the 16th of December, 1870. The contractor is Mr. William Brass; the clerk of works, Mr. William Trickett. The contract amounts to 129,718*l.*

The whole of the carving and sculpture has been executed by Mr. Burnie Philip. The site cost, we believe, in round numbers, 300,000 .



THE NEW POST-OFFICE, ST. MARTIN'S-LE-GRAND.—Mr. James Williams, Architect.



GROUND FLOOR PLAN

THE NEW POST-OFFICE BUILDINGS, ST. MARTIN'S-LE-GRAND, LONDON.

DEFECTS IN THE SANITARY PROVISIONS OF THE METROPOLITAN BUILDING ACT.

At the close of Mr. Liddle's paper, of which we gave a summary in our last (p. 63),—

Dr. Hardwicke said, that in the district over which he had supervision there were above 300 houses annually built. There were two striking defects in the present way of building houses, which were not provided against by the existing law. One was the wretched foundations on which they were raised. The surface of the ground was frequently taken off, and a large portion was filled up with rubbish, which he had often found by analysis to be organic refuse. And much offensive matter was under many houses, and was used also in the making of mortar. He had seen the latter substance giving evidence by its yellow colour of the presence of such objectionable material. Such houses might well be called disease-traps. The dampness which defective construction caused also gave rise to much sickness in the new building. Another defect was, that when new streets were formed, the local boards did not take to them, and form the roads in proper time. A long period generally elapsed before this was done, and the consequence was that a low class of tenants got into the houses, and the whole neighbourhood became deteriorated. The sloppy condition of these neglected streets gave rise to much sickness. One great cause of shortcomings, he thought, arose from the fact that the Metropolitan Board of Works had no sanitary officer connected with themselves to whom to appeal in doubtful matters. He believed the Artizans and Workmen's Dwellings Act was in practice totally unworkable.

Mr. P. H. Holland thought the paper which had been read was characterised by great common sense. There was one portion to which, however, he must take exception, and that was the recommendation, as he understood it, that the whole of the management should be under the local boards. He thought it extremely important that the control should be rather under one separate board. The little local boards were the most troublesome bodies that were ever created. If the power were given to them, how were they to be controlled, and made answerable for neglect? It was highly necessary, he thought, to have a body constituted for the management of such matters which would not be under local influence. If the local boards were to be supreme each in its own district, we should have the sanitary measures carried out in some, and neglected in others. There should be, in his opinon, but one authority for the whole of London. A great defect in the appointment of district surveyors was, that they held their offices in conjunction with their own private businesses. The result was that their own business naturally had their first attention, and the public business was consequently neglected. He thought the district surveyors did more harm than good. London was certainly one of the worst built cities that could be found. Fires in provincial towns were not so destructive to human life as here. Fire-escapes were rarely found in these towns, nor was their absence felt. He thought the district surveyors simply looked at the letter of the law, and to them he referred much of what was objectionable. Were not lath-and-plaster walls very common? and what could tend more to the spread of fires when they broke out? Why had the surveyors allowed this and other equally unwise things to exist? A large sum of money was spent in recompensing their services, which would be better spent in engaging the whole services of a smaller number, and relieving them of the necessity of following private employment. We should get a number of new houses properly built, and then we should have specimens of what houses ought to be. They could not be found in London, at a price within the means of the great bulk of the people. Then where could they find houses properly ventilated? The means of exit from churches and other such buildings were very meagre, and in case of alarm of fire would be certain to lead to persons being crushed to death. Would not in such cases the fault of the architects amount to manslaughter? Fatal results had followed in some instances; and in such a place as Exeter Hall, for instance, a sudden alarm would lead to lamentable consequences. He almost despaired of seeing architects doing their work intelligently.

Mr. G. Godwin rose to protest against the unfounded attacks upon district surveyors made by the last speaker. They had simply the power of seeing the Building Act carried out, and this they did in the majority of cases most efficiently. They were certainly constantly foiled in their endeavours, but they did the best they could. In the matter of foundations, for example, the Act said walls must be on a solid foundation *or* a layer of concrete; the Act did not say what must be under the concrete, nor of what thickness it should be laid. If the surveyor found defects which were not expressly provided against in the Act, and went before a magistrate with his complaint, he would certainly lose the day. Ventilation did not fall within his province; he had no power whatever to interfere. The impatience of the public to pay for anything for which there seemed no immediate necessity, was an obstacle to be overcome before this could be properly carried out. The surveyors were not responsible for the construction of drains. That was a matter under the Metropolitan Management Act. Now that a new Bill was under consideration was the time to strengthen it by the representations of the bodies who have had experience in matters which it is designed to meet. Most of what had been brought forward by Mr. Liddle had already been laid before the Metropolitan Board of Works. He (Mr. Godwin) had no fault to find with what he had said. The clauses in the present Act respecting underground dwellings were found to be nearly nugatory in their operation. It was a difficult task to find out whether rooms had been slept in, and this was the way it was enacted they should be dealt with. All that the district surveyors could do in the matter was to say whether or not rooms that were pointed out to them were or were not fit for occupation according to the Act.

Dr. G. Ross wished to draw attention to the defects in the 29th section of the Building Act. In a very crowded neighbourhood, a man might build in his back yard, so as to double the number of those for whom accommodation was provided. The Act, he had found, impeded the action of officers of health, and tended to increase sanitary evils. By evading the provisions, any proprietor could go on increasing the number of houses. Attics must be, by the Act, at least 7 ft. high over half their area: why not all? This part of the house, for various considerations, should, if anything, be more lofty than any other. There was no cause, in his opinion, that was half so important as good, sound, wholesome buildings. Many of the poorer class were brought into the low state of health in which they were found to be in consequence of the close, small, crowded houses in which they dwelt. He thought the Artizans' Dwellings Act might be made extremely useful. Many houses had been pulled down to make way for improvements, and many poor people had been turned out without compensation, and had gone to increase the number of the inhabitants of already overcrowded neighbourhoods. This was a hardship, but still, if sanitary improvements were to proceed, he could not see how such could be avoided. There would be a great difficulty in providing compensation, for it might tend to encourage so great an expenditure that few local boards would find courage to commence any sanitary works when so great an expense would follow. Still something might perhaps be done in this direction. He could himself testify to the abominable stuff that was used sometimes in making mortar. Often that which was taken from the sewers was used in making mortar. Another evil was, that contractors took away the gravel on which a house was thought to be built, and substituted loads of rubbish. This, which was done everywhere, should not be allowed.

Mr. Edwin Chadwick thought it was deplorable that the subject brought forward by Mr. Liddle should have made so little way, and that even of first-class houses it should still be a sanitary rule that they are unsafe to inhabit until nine or twelve months after their construction. Speaking not long since to the superintending registrar of a suburban district, and expressing surprise that although much money had been spent no progress had been made in the reduction of the death-rates, his answer was, that the death-rates were kept up by the building of new houses (the constructions by which the death-rates should be reduced), for soon after a block of new houses was entered, or within a month or two after, the doctor's carriage was seen at the doors, and not long after that he, the registrar, had to record additional deaths, especially amongst children. The fact was architectural construction and sanitary construction were different things, and sanitary science, or responsibility for sanitary results, had not yet been conjoined with architectural art and practice. Soon after the publication of the sanitary report, he had been requested to join a committee of first-class or palace architects, to frame a new Building Act for the metropolis. He had begged to be excused from that service, because their regular doctrines and practice were so little in accordance with what he considered the chief objects to be aimed at, that there would be no use in going into the subject with them. He could not hope to alter their fixed opinions, and should be in a minority of one. At that time he objected that the functions of the officers superintending new buildings were fragmentary, incomplete, and misfitting. The district surveyors as a class were doubtless very respectable men, but the duties assigned to them were fragmentary and incomplete. Look only to the sanitary arrangements required as respects the basement. The subsoil drainage, which is requisite to keep the road firm and in line, is the same that is required to abate damp in the site of the house and its grounds. The house drain — the channel that is to remove putrescible matter, and not let it permeate and pollute the subsoil—required care in its firm construction, and in its adaptation to the discharge into the street sewer, to make both drain and sewer complete and self-cleansing, and act as one piece of work. The drain that is to carry off the horse-dung and surface-washing from the roads—on which there is often as much putrescible matter to be removed as from within the houses—must also be well adjusted and self-cleansing, and well adapted to the street sewer, in which refuse should not be kept stagnant, as it usually is, with other matter, but to be at once removed from beneath the site of the town before it can enter into noxious decomposition. The impermeable drain of the house, and the impermeable drain of the road surface, the sewer of the house and road, required therefore careful adjustment to act as one work, to carry their contents in one direction, whilst the permeable subsoil drain of the road and the permeable subsoil drain of the house and land required careful adjustment, to carry their contents in another direction. Would any one, laying out work intelligently, *de novo*, think of treating this combined drainage apparatus in parts to be dealt with independently? But in administration there was one officer, the building surveyor, who has only supervision of one part,—that is the house, and not always of the house drain, or the sanitary arrangements for the immediate removal of putrescible matter. Then there was the road-surveyor, who had nothing to do with the subsoil drainage, on which the wear of his road mainly depends, nor with the sewer, which is to receive its surface drainage, and which, if it be a permeable sewer, may let out sewage, and let it permeate the subsoil, as well as take it in. Then there was the drainage surveyor, who had charge of the street sewer only, and very little charge in the way of adjustment, with the tributaries, the house, or the road drains, the capillaries of a proper system of sanitary work. Each of these officers had usually to be sent for at different times, when they could be got from their private practice, to supervise their respective bits of unsystematised work? Could there be any arrangement more calculated to ensure misfits, and disjointed, imperfect, and therefore wasteful work? and to do it at a great expense of separate time, notices, and separate service? Surely we might hope for an advanced perception of the economy; of a better organisation; of the functions requisite to insure efficiency and economy in local works, under the superintendence of officers, with the qualifications of sanitary engineers, giving their whole time to the performance of their duties.

Mr. Baldwin Latham, C.E., observed that he could not at all agree with Mr. Holland in the remarks he had made with reference to the incompetency of the district surveyors of London to discharge their duties; on the other hand, he agreed with Mr. Godwin that these officers were thoroughly competent to discharge the duties they were called upon to perform, and moreover they were the only class of officers who, by examination, had proved themselves competent to discharge their duties, which were entirely of a structural character. He, however, thought, with Mr. Chadwick, that it would be an advantage for the officers who had the structural control of buildings also to have sanitary control. Probably it would be well that some central authority should be appointed, with absolute control over the construction and sanitary requirements of all buildings hereafter to be or at present erected. The question was a very much larger one than that of merely applying a certain Act of Parliament to the metropolis. There

were many large towns and country places that equally required a Building Act, and it would be well for the Association to promote some measure whereby a general Act of Parliament should be introduced that could be applied to the whole country. It was true, that under the provisions of the Local Government Act, Local Boards had power to make by-laws for regulating buildings; yet it was notorious, especially in districts in which building operations were carried on to a great extent, that those interested in promoting such building operations took care to have such representatives on the Board, that either the by-laws were favourable to their scheme, or were not put in force against them. An examination of the by-laws of various Local Boards would show a marked difference. Usually in the districts where they were most required the by-laws were most defective; while in districts where there was but little building going on, the by-laws were of a very perfect character. With regard to by-laws, it had been decided that the by-laws of Local Boards do not apply to buildings erected previously to the passing of the Act under which they were framed; consequently, open spaces about old buildings were built upon, excluding light and air, to the detriment of the people inhabiting the district. The sweeping away of the by-laws which now regulate the construction of buildings, the passing of an Act of Parliament applicable to all parts of the country, regulating their stability, the means for the prevention of the spread of fire, and their sanitary requirements, would be a great boon to the country at large.

Professor Donaldson could affirm almost all Mr. Liddle had said. He did not agree with those who thought that the Local Boards should be consolidated into one body. He thought, considering the different operations, it would be impossible to put them all upon the shoulders of one man. In his own district no houses could be built unless the plans were submitted to the Local Board. Certain conditions in the sizes of rooms should be observed. But the regulations it was found very difficult to carry out. He himself had from time to time made reports to those under whom he acted; but frequently no attention was paid to them. The surveyor often went round, and made his report, and they often proved to be nothing more than waste paper. This was very discouraging. With regard to the overcrowding of rooms, it was a shame to society that matters should be as they were. He did not think these defects could be fairly charged to the surveyors. They were anxious to do their duty; and if their suggestions were not carried out, the fault did not lie with them. The walls of a house should be built on concrete, and the direction of it should be left to the district surveyor, who should be allowed the power of advising the magistrate. At the present time, if a complaint were made, the builder would bring half a dozen builders to show that he had built the house properly, and the magistrate would say that the weight of evidence was in his favour, and the surveyor would have to sustain the costs of the action. He (Professor Donaldson) thought the whole area of the basement should be covered with concrete. The difficulty in the adoption of suitable measures lay in the fact that there were men in the House of Commons and on the Local Boards who were themselves builders, and from them great obstructions were likely to be encountered. He could not see how it could be that gravel should be forbidden to be taken away, for it was the property of the owner of the soil. If a man wished to take it away, and sell it, he did not see how he could be hindered from so doing. The observations about the reservation of a proper area for ventilation were excellent; but he thought they could not be carried out where space was very valuable. Area was more necessary to be given in the sleeping-rooms. He hoped the suggestions of Mr. Liddle would come before those who were engaged in drawing up the new Building Bill.

Mr. J. P. Seddon called attention to the matter as it concerned the roofs of houses. The usual little flimsy sheet of slate was not sufficient in the face of great calamities from fire, such as had occurred in America. The roofs should be made more uninflammable. The construction of our houses was in the hands of speculating builders. The way in which our streets are built is the curse of the age. Matters should not be left so much in the hands of builders. Architects were not employed for one-tithe of the houses that were built.

Mr. Harry Oliver wished to say that he thought Mr. Liddle should make himself well acquainted with the Bill about to be brought before Parliament. This, he thought, he had failed to do. Before any action was taken by this Society, it was very requisite that this should be done. Much that was suggested, he thought, would be found in that Bill; and if anything should remain, it would be received with thanks. It was important medical men and architects should act in harmony. Matters could be better carried out when the efforts of the one body did not infringe upon those of the other.

The chairman (Lieut.-Col. Beresford, M.P.) deprecated the idea that this question should lie with the Metropolitan Board of Works. They were so overwhelmed with work, that the less that was put into their hands the better. There was a competition between three different authorities who acted in sanitary matters; these were the Metropolitan Board of Works, the Thames Conservancy, and the Corporation. This had, in some cases, produced confusion. He thought the Public Health Bill was a most excellent Bill as far as it went. That Bill not only gave the power of dealing with sanitary matters, but it made it compulsory that its enactments should be carried out. There should be a power invested in certain authorities of seeing to the making good roads and the foundations of houses. In his own neighbourhood he had tried the effect of the existing means; it was in the case of a place which was in a disgraceful state. He had addressed a letter to the Sanitary Board; the property was immediately inspected, and shown to be in a state injurious to health. The private owners had subsequently received orders to put it in order. If we failed to get all that Mr. Liddle proposed, we had the present Act to fall back upon, and this he had proved was not inoperative. He (the chairman) thought the water question went side by side with the building. There should be a constant supply, and better facilities for establishing it. One gentleman drew a distinction between the living part and the sleeping part of houses. He (the chairman) was afraid that, for a vast number of families in London, this distinction did not exist. He trusted the matter now discussed would go to the Local Government Board, and influence their decisions.

Mr. Liddle was glad to find that almost all the speakers agreed with him generally. He was perfectly well acquainted with all the amendments in the existing law proposed by the Board of Works, and he had been informed that that body did not intend to bring in any Bill. He thought they could not be successful in any sanitary works, as they had no medical adviser to help them. The great absurdity of the present state of things was the different and distinct Acts which referred to matters substantially the same. To build a house a person must consult half a dozen Acts. Those should all be brought into one.

On the motion of Mr. Edward Pears, it was resolved unanimously:—

"That the paper be referred to the Committee of the Health Department, with a view to considering the desirability of making representations to the Local Government Board in favour of an amendment of the Act."

NOTTINGHAM SCHOOL OF ART.

THE annual distribution of prizes to the successful students in connexion with this institution took place on January 15th, in the Mechanics' Hall. There was a large attendance. Lord Belper presided, and among those present was Mr. H. Cole, C.B., who delivered the prizes, and on this occasion announced his own retirement from the Science and Art Department.

Mr. Cole said, had he been present last year, he should have ventured a few observations to them on the position in which Nottingham stood with regard to art and its fitness for establishing a museum of science and art. He was particularly happy in not having to talk about an anticipation, but rather of a promise which had been held out, and amply fulfilled. They knew that the Museum of Art and Science in this town had had a beginning, and he hoped it was the commencement of much greater things in the future. He thought that Nottingham was distinguished for its modern architecture; and though they could not perhaps equal Lombard-street, yet they were superior to many other towns. He hoped his lordship would not think he was saying too much if he said that Nottingham was more distinguished in this respect than Derby, and he also believed that Leicester was a long way behind as compared with Nottingham Their school of art was, in some respects, the very first school in the country. It was certainly the cleanest and best kept, and he could show by figures that it occupied a high position in the work it did. All these facts made him concur in thinking that Nottingham might take the lead in the country in establishing a museum of science and art, and in setting an example to other towns in England. He regretted to state that in this matter England was behind the Continental countries. They were aware that they could not go from London to Paris without lighting on several museums of this kind. He thought, however, that the various matters he had mentioned justified him in asking them to consider the question of establishing a museum of science and art. He had taken some trouble to look about in ascertaining what would be a good site, and the conviction in his mind was that they had a site already prepared,—one that would act as a beacon to all the Midland counties,—and that was the Castle. If they did what they could with the Castle, he believed that it would be one of the very finest things in all England. He was told the trustees of the Castle were quite willing to help them, and he had already seen a plan and design that had been made for building up the Castle again, and preserving the design of the old building, which was attributed to that distinguished architect, Inigo Jones. An architect to whom Nottingham owed much of its originality and beauty, had prepared a plan, and he dared say it would not long be a great secret. The question was, was Nottingham to assist in an operation of this kind? His strong faith was that it would. He wished to tell them, as a fact, that Nottingham had taken public money for master's prizes more than the average. With regard to the students, he reminded them that there were 120 schools competing for the State medals, gold, silver, and bronze. Gold medals had been given away for seven years, and there were not more than ten gold medals given every year. The seventy medals that had been given away had been competed for by 120 schools, the average being less than a medal per school, and of the seventy Nottingham had gained no less than six. In fact, the medals taken by Nottingham,—and no doubt their skill in cock-fighting, prize-fighting, and rifle-shooting had something to do with the result,—were eight times the average of the schools of the whole kingdom.

Mr. Rawle, the head-master, addressed the students.

From a Department of Science and Art report, recently issued, we observe, that in the Government examinations in drawing of 1872, the Nottingham school has again, for the fifth year, headed the lists, and has, for two years running, beaten the South Kensington and other metropolitan schools. We give the names of some of the schools which have taken the greatest number of prizes:—Nottingham, 56; Birmingham, 51; South Kensington, 42; Derby and Dufield, 40; Glasgow, 39; West London, 37; Manchester (G.S.), 33; Bloomsbury, 28; Leicester, 28; Lambeth, 27; Dublin, 25; Edinburgh, 25; Bristol, 24; Sheffield, 24; Manchester (R.I.), 23; Brighton, 22; Exeter, 22; Lincoln, 22; Liverpool (S.D.), 21; Newcastle-on-Tyne, 20; Bradford, 19; North London, 19; Belfast, 18; Leeds (M.I.), 18; Sunderland, 18.

IRRIGATION IN NORTHERN INDIA.

INSTITUTION OF CIVIL ENGINEERS.

AT the meeting on January 14th, the paper read was "On the Practice and Results of Irrigation in Northern India," by Colonel W. H. Greathed, C.B., Chief Engineer of Irrigation to the Government of the North-Western Provinces.

The object of the paper was to describe what had been done and what was now doing in that portion of Upper India where irrigation had been longest practised, and on the largest scale. The tract of country under consideration was included between the Himalaya range on the north, the River Brahmaputra on the east, and the rivers which merged into the Indus on the west.

The people of the North-Western Provinces had practised sinking wells for irrigation from the earliest periods. The depth at which water was found in the Plains varied from 10 ft. to 50 ft. below the surface. At the lesser depth a little pit supplied as much water as could be lifted in a day in a jar attached to a light

balance-beam worked by men. Two men could keep a plot of an acre watered, but the demand on labour prevented its employment on a large scale. Pits of this description fell in during the rainy season, and had to be annually renewed at the cost of the tenant. Deeper wells, lined with brushwood cylinders, and worked by bullock power, cost from 5*l.* to 18*l.* apiece, and employed six men and three pairs of bullocks every day to keep five acres watered.

Extracts were given from the official account of the famine of 1868-9, describing the desolation in districts unprovided with canals, and the security of those that were irrigated.

The scheme projected for turning all available waters to the greatest advantage was next detailed. The characteristics of the rivers Ganges and Jumna, which included between them the larger part of the zone of "Plains," were identical. Both rose in eternal snows, and both received large affluents before leaving the mountains. The drainage area of the Ganges was 11,200 square miles, that of the Jumna 7,800 square miles. The flow of water in the greatest floods was respectively 230,000 and 160,000 cubic feet per second, and when these rivers were at their lowest, from the middle of January to the end of March, the flow was reduced to 4,000 cubic feet and 2,000 cubic feet.

The Ganges Canal was perhaps the largest work of the kind in the world. Its full capacity was 6,500 cubic feet of water a second. The width of bed on the Solani Aqueduct, eighteen miles from the head, was 164 ft., and the depth 10 ft. The main channel was 348 miles in length, and it was navigable throughout; the branches were 306 miles in aggregate length, and the distributaries 3,071 miles. A carriage road was kept up on all main and branch canals, and the banks were planted with timber trees. The flow of water per second in 1870-71 was 4,300 cubic feet, and 767,000 acres were watered in 5,061 villages. Irrigation commenced twenty-two miles below the head works, and was diffused over an area 320 miles long by about 50 wide. The sub-Himalayan drainage, which the canal crossed, was passed partly into, partly over, and partly under the canal. The works in the upper part were chiefly constructed on block foundations, perforated with wells, by means of which they were sunk in running sand to a hard stratum. The Solani Aqueduct spanned a valley two miles and a half in width; its foundations were supported by the pressure and friction of wet sand, and no subsidence had occurred. The slope of the country in the upper part of the canal was much more rapid than that given to the canal beds,—a difficulty which had been overcome by masonry ogee falls; in place of these, vertical weirs with long crests were being built on new canals. The difficulty of the conditions under which the Ganges Canal works were commenced was detailed, and the functions of the canal officers. The earning of a cubic foot of water on the Ganges Canal, in 1870-71, was 44*l.* per annum; on the Eastern Jumna, 59*l.*

The net income of all the canals in the North-Western Provinces, in 1870-71, after the payment of working expenses, was 182,437*l.*, being 6·64 per cent. on the capital cost of 2,714,631*l.*

The Agra Canal had been projected for the irrigation of the Muttra and Agra districts, on the right bank of the Jumna, below Delhi. A weir, 2,428 ft. long, had been built across the Jumna, at a point where a spur of quartz from the Aravali range abutted upon the river. The work had no foundations. It consisted of two parallel masonry walls, 2,428 ft. long, running from end to end of the weir, of which the footings rested on the fine sand of the river-bed at low-water surface level. Between these walls, which were 26 ft. apart, stone was packed, and a slope of stone was constructed, up stream with a base of 40 ft., and down stream with a base of 200 ft. Scouring sluices were constructed on one flank of the weir, to keep a clear channel in front of the canal head. This weir, when partially constructed, had satisfactorily withstood the greatest known flood on the Jumna.

The financial results were also explained. At the end of the year 1871 upwards of a million acres were irrigated from existing works, which afforded a net return of 182,500*l.* The capital expended had been 2,747,000*l.*, and the net profit on the whole was 6·64 per cent. When fully completed, the cost of the undertakings would amount to about 7,500,000*l.*, with a return of 12 per cent. on the capital when the canals were fully developed.

The principal canal in operation was the Western Jumna, an old Mahomedan work. It had paid nearly 2,000,000*l.* clear profit, after repaying capital. The Baree Doab Canal, taken from the river Ravee, was constructed on the model of the Ganges Canal, and was gradually making way.

There were profitable inundation canals on the Indus, the Chenab, and the Sutlej. The Sirhind Canal, now under construction, would cost about 2,000,000*l.*, and irrigate a country where rain was very scarce. It was calculated to pay about 9 per cent.

In conclusion, it was stated that about 250 engineers, of and above the rank of assistant-engineers, are employed, under the Indian Department of Irrigation, in developing the advancement and prosperity of the country.

GAS EXPLOSION: HYDRAULIC GASELIERS.

A serious gas explosion has occurred at Pierrepont-street, Bath. An escape of gas being suspected in the parlour, a workman was called in. No sooner had he struck a light than an explosion took place, hurling the man from the steps on which he was standing, and breaking the fan-light over the street-door. The cause of the escape was want of water in the pendant. Workmen dealing with gas ought to know better than to strike a light on such an occasion. As to the want of water, this is the fitting time and place to recall what we said about three winters ago as to hydraulic gaseliers. Water is not only ready to evaporate in a short time, but also, when frost comes, to burst the tubing, and thus it incurs a double risk. We then stated that oil was much preferable to water; and we have now to notify that a gaselier which we supplied three years since with oil has continued till now in good order, a little oil having only once been added. No frost has injured it, and no risk has been run from escape of gas; neither has the oil given the slightest disagreeable smell. Never mind what gas-men say about oil in hydraulic gaseliers (it was colza oil): water suits *them* best, explosions notwithstanding.

BUILDINGS IN BIRMINGHAM.

Three blocks of buildings are being erected fronting to New-street, Birmingham, the total length being 238 ft.; also buildings on each side an intended passage from New-street to the London and North-Western Railway Station, the frontage being 154 ft.; and another range of buildings opposite the station on each side, the upper stories being carried over the passage, and having a frontage of 80 ft.

Part of the erections is arranged as a hotel, and the remainder is to be let as shops, warehouses, and offices. The materials employed are white brick and stone. The style is Italian, with considerable ornamentation, both in terra cotta and in stonework, the whole of the front being carried on iron columns, and so arranged that the plate-glass extends in front of all the supports, so as to give the greatest possible amount of space for the display of goods; but, unfortunately, in an architectural point of view, this detracts from its effect, as it gives the buildings the appearance of standing on glass. Part of the buildings next New-street is now being proceeded with under contracts entered into with Mr. John Garlick and Mr. Charles Jones, both of this town, and the other portions will be commenced as soon as possible. Mr. Thomson Plevins, of Birmingham, is the architect engaged upon the works.

THE SALT STATUE FOR BRADFORD.

A wooden structure, opposite the Bridge-street corner of the new town-hall, has been put up on the site of the statue to be erected to Sir Titus Salt, bart., in order to give some idea as to whether the site would be really a suitable one. This structure, which has been undertaken by Messrs. Farmer & Brindley, who have executed the whole of the carving in the new town-hall, is in an advanced stage of completion. The form of the erection is quadrangular. The base consists of four steps, on the top of which is placed the pedestal, the whole raising the statue 8 ft. above the level of the road. Over the statue is a canopy, supported at each corner by clustered shafts of polished Shapp granite. These shafts support the arches of the four sides of the principal stage. The four arches are decorated with gablets terminating in stone finials. Over this principal stage is an intermediate stage, with niches in each face of the structure, for the reception of four statues, representing Charity, Justice, Temperance, and Prudence. The upper part of the canopy is decorated with arches, gables, and angle pinnacles, and terminated by a stone spire, rising to a total height from the ground of 45 ft. The whole edifice has been designed by Messrs. Lockwood & Mawson, the architects of the town-hall, and is in harmony with the architecture of that building. The statue itself is also very nearly completed, in the studio of Mr. Adams Acton, the sculptor. The figure is being executed in white Carrara marble, and represents Sir Titus seated in a chair: although in a sitting posture, its height is 7 ft. The stone of which the canopy is formed was all obtained from the Cliff Wood Quarries, out of which the whole of the stone used in the front of the town-hall was also obtained.

STATION PLATFORMS.

Captain Tyler, in reporting to the Board of Trade upon the accident which caused the death of Sir Donald M'Leod, recommends a uniform standard for passenger platforms and carriages on the metropolitan lines, and suggests that in the meantime the carriages should be supplied with continuous footboards. Captain Tyler also points out the necessity for careful supervision in regard to the starting of the trains. The danger of the platforms on the metropolitan lines we gave urgent warning of the year before last, and previously; but it required the sacrifice of some special personage ere anything could be done. As long as only an obscure victim now and then was mangled and destroyed, the railway Juggernaut just moved on as before; but now we shall have something done.

Sir,—Doubtless the public will appreciate the valuable recommendations made by Captain Tyler for improvements in the heights of railway platforms and continuous carriage footboards as a preventive, in some degree, of those frequent accidents to which Sir Donald McLeod unhappily fell a victim.

I should, however, like to call attention to a matter which seems to have been overlooked. The means of platform ingress and egress being in many instances by one gateway, there must be a risk of persons rushing after a train in motion if the gate be left open for the exit of arriving passengers, or if it be closed when the train is signalled the latter have to waste time in waiting for the not very active porters to open the gate when the train has left, a constant occurrence at some of the metropolitan stations. Now, to avoid both these difficulties I would suggest the erection of high iron turnstiles to open in opposite directions: thus, when a train is signalled "in" the inlet turnstile should be locked, the other being free for exit, but provided with a lock for wholly closing the platforms.

If this plan were adopted, one divided way would suffice at all stations where room was not available, and effect a saving both in officials and the time of the travelling public.

Archibald D. Dawnay,
Assoc. Inst. C.E.

APPRENTICESHIP TO BUILDING TRADES.

BENFORD *v.* WAINWRIGHT.

This action, brought in the Marylebone County Court, concerning apprenticeship, is deserving attention.

The parents were the plaintiffs, suing, as next friends, Mr. Wainwright, for the sum of 11*l.* 10s. 6d., part of premium paid on account, and the addition of the Inland Revenue stamp for indenture for apprenticing the son, and the indentures being cancelled afterwards.

Mrs. Benford, the mother of the cancelled apprentice, said by the terms agreed upon her son was appreticed to the defendant, and Mr. Wainwright drew up the indenture for her to sign for the boy. She paid 10*l.* down, and at eighteen months' end she was to pay another 10*l.* Before she signed the indenture, her son was sent to see how he liked the trade of a builder and cabinet-maker, and he brought back the indenture of the apprenticeship for her to sign. The way the indenture was drawn up caused her to refuse having further to do with it. She upon this, not desiring her son to leave the cabinet or building trade, got another copy of indenture made out, and sent it to the master, along with 1*l.* 10s. for the stamp. This the master refused to sign, and the mother of the apprentice now asserted to the Court that the second document was very little different from the first.

The master did not look upon this in the light advanced by the parents, and would not sign the second copy of indenture, the important point being the hours of work for the lad; and as the indenture was incomplete, the mother withdrew the proposed apprentice, who had been with the mahogany builder over three weeks, and appeared to like the trade.

The mother applied to the defendant, after she had taken the embryo apprentice away, and demanded the moneys she had paid the master back.

Counsel were engaged in this knotty apprenticeship dispute, and it was elicited in cross-examination by Mr. Sleigh that the lad had actually been paid wages, and that the cause the mother did not complete the indentures was that the hours were too hard on the apprentice.

Mr. Warner Sleigh, for the defendant, said this was no ordinary case of apprenticeship. If actions of this nature were to stand, builders would not teach boys their trade upon this whim of their mothers. The boy was ready to go back to his master, and the master willing to have him, as an apprentice and teach him his trade. The mother, however, by some woman's whim wanted her son back again. It was not only customary to the cabinet and building trades to take lads on trial, but it generally occurred that the premium for the apprenticeship was withheld until the boy had what was termed a trial. First, the master had an opportunity to note what sort of a lad he was going to bind himself to for seven years, and the young apprentice was afforded an opportunity of learning the nature of his trade, and the sort of home he had to look forward to. This was a fair bargain on each side. On the other hand, apprentices were taken as paupers, and in that case the guardians were bound to look after their wards, but seldom did, and this apprenticeship ended in the lads running away or turning out indifferent workmen. It became, therefore, the master's direct interest to exact a deposit to bind the bargain. It was not to be supposed that lads should enter a building or cabinet-making firm, give a month's trouble to masters, foremen, and leading men to instruct the arts and mysteries of a trade, and then, upon the mere whim of a mother,—who had better have left the apprenticeship to her husband,—come back to his client and say, "Unless you alter our first copy of indenture to my liking, my son shall not be bound to you; and, as you refuse to do so, hand me back the deposit. Another feature in the case was the bringing an apprenticeship dispute into a county court. The magistrates had always adjudicated here, and had legal powers to cancel an indenture and imprison an apprentice for wrong doing to his master. Here, however, the lad was not finally bound, but willing to serve. In the City of London there was a high official called a Chamberlain first especially appointed by Edward VI. to look after the apprentices, and so unruly were these young gentlemen as to need a "Bridewell" to correct their bad habits. That had now been pulled down, and it seemed all the good old apprenticeship laws and customs had gone with it, or such an action as this could never have been instituted. On behalf of builders, cabinet-makers, and others, he called upon the court to repudiate this claim.

Mr. Macnamara, the judge, said in this case he must act as *amicus curiæ*, as, whichever way he might decide, it would lead to unpleasantness and ill feeling, and particularly to the one most interested; for even if the boy returned to the proposed master, the mother would never be satisfied.

Mr. Sleigh, interrupting, said the master had not broken his contract by not teaching the lad his trade, but his mother had.

The Judge said that appeared to be the case, but all parties here were in a fix. The Judge was to decide a matter of trade custom that was disputed, and which, perhaps, should have been brought before a magistrate. If the parties would take his friendly judgment, it would be that the plaintiff should divide the ten pounds, which would recoup the master for his trouble with the boy, and this judgment would perhaps rule other cases that might come before County Courts, on the side of equity. It was not to be supposed that masters were going to the expense and trouble of keeping lads a month on trial without any *honorarium*. The value of the stamp might be got back from Government if the suitor sued the Chancellor of the Exchequer, supposing that the stamp had been got.

The parties to the cause had a conversation, and agreed to the Judge's verdict that each party were to pay their own costs, and the defendant return five pounds.

[In this rather important case with respect to apprentices, no direct decision has been arrived at. It is clear, however, that the County Courts have jurisdiction between master and apprentice, and even in the case of a lad actually apprenticed, the County Court Judge, sitting as a magistrate, has powers to deal with apprentices over police magistrates. It was stated outside the court, that a police magistrate had actually referred the case to a County Court.]

THE OLD HOUSE, ENFIELD.

SIR,—It will interest your readers to know that the magnificent brickwork alluded to in your journal of the 11th and 18th ult., has been secured for the South Kensington Museum. The Old House is now being razed; and experienced workmen are engaged in taking down the brickwork for the purpose of removal.

Mr. Alexander Andrews, with whom I have spoken on the subject, does not agree with your correspondent, Mr. Wilson, in calling the old house the "Manor House," as Lysons speaks of the Manor House (for some time the residence of the Wroth family) as having been "long pulled down," in his time, and which seems to have stood on the Chase, some distance from the town.

TH. BATTERBURY.

THE EFFECT OF CHARCOAL ON PLASTERING.

SIR,—I have a kitchen in which a good deal of charcoal is used in the usual way in little open fires along one side of the room, and to its use I attribute the falling away of large patches of the plastering on the ceiling and the upper portion of the side walls, as well as the whitewash by which it has been yearly coated. It is lofty enough, and there is a ventilator in the ceiling sufficient for the purpose; and the position of the roof would seem to favour its action, as the kitchen is a detached building, and is ceiled a considerable way up the roof inside. I have tried painting it, but it seems to blister and break, or crack, but does not come off easily; but its appearance is bad, and it is getting so unsightly that I expect I must take off all the plastering, and do it again. Now, may I ask, through your valuable paper, what is the best mode to do it, so as to resist the sulphurous vapour given off by the charcoal? In some similar cases, I am told that when the lime is mixed with coal-ashes instead of sand, it is not so much affected, but I have never seen it used in a dwelling-house; while in some of the hop-kilns, where large quantities of sulphur are used as well as charcoal, the ceilings are composed of tempered clay; but this would not do so well in my case, as a decent appearance is required. Possibly some of the cements so much in use now would answer the purpose, but I would prefer lime if it could be made to do.

Perhaps some of your readers will kindly help me in the matter. At the same time, it is needless to advise the charcoal being discontinued, for I have already urged that, with no better result than the choice of a strike or revolution. I expect amongst the many remedies or appliances now at hand for every evil, some one will be able to give a practical and not expensive one for the above. In so doing he will confer a favour on a twenty years' subscriber.

L. L.

HOW FAR IS AN ARCHITECT LIABLE?

SIR,—I have had built two houses, at a cost of 500*l*., employed an architect to make plans, &c., and see everything done properly, and paid the whole of the cash on the faith of his certificates. Ten months elapse; the pumps then draw air. On examination, the whole of the lead pipe proves to be full of sand-holes, and not of the quality specified, necessitating the substitution of new, at a cost of 6*l*. Now, sir, what is the best thing to do? The contractor has since died. Can I recover of the architect?

M. H.

*** This, though a small matter, raises a large question,—one by no means settled, and on which we shall be glad to hear what correspondents have to say.

NEW DRINKING FOUNTAIN IN CHESTER.

MISS HUMBLE, in memory of her two sisters, and her brother, the late Mr. E. Humble, has presented to the corporation of Chester a drinking-fountain. It is situated at the junction of the Tarvin and Christleton roads, in the suburb of Boughton, and has been recently opened. The main body of the structure, surmounted by a hood, is hexagonal in plan, three sides having inscribed panels alternating with a bowl on each of the other sides. The bowls are of grey granite, polished inside, with fine axed exterior surfaces, on which lotus-flowers are carved, while leaves of the same plant encircle the rock-faced recesses above them, out of which the water flows. A willow wreath is cut upon a torus, forming an appropriate neck mould for a memorial fountain. The feed-pipes are long brass unions, constructed so as to present only a strong shield of brass to mischievous persons, the water flowing from openings in the pipe, about 3 in. back in the stonework. The overflows from the bowls feed three troughs for cattle; these troughs face the panels, and are easily reached from the side of the road, the curbstone alone intervening. All the stonework is of York stone, with the exception of the bowls.

The hood terminates with a bronze and gilt lamp, the ladder-rests serving as guides to wayfarers.

The presentation is recorded on one of the panels; and the texts, St. Luke xviii. 16, and St. John xiii. 14, occupy the other two.

Messrs. Harrisson & Senton, Liverpool, were the architects; and Mr. H. Wigginer was the contractor.

THE TRADES MOVEMENT.

The Building Trade of London.—It will be remembered that last summer the operatives in the various branches of the London building trade made a demand for an increase of one penny per hour in their rate of wages, and that the employers conceded one halfpenny. The Central Association of Master Builders have just received notice that this year the men intend to "stand out" for the other halfpenny, making their wages 9d. per hour, "in accordance with the terms of their original memorial." The notice fixes the 19th of July next as the date for the increase to come into operation, and adds that, "considering the increased cost of the necessaries of life, they find the purchasing power of money, within the last few years, has been reduced at least 20 per cent."

The South Wales Strike.—A meeting of the fitters and smiths, carpenters and other "tradesmen," employed in the Dowlais, Plymouth, and Cyfarthfa works, has been held at Penydarren, for the purpose of considering their position in relation to the strike. In the course of a temperate discussion it seems to have been made pretty clear that all present were desirous of continuing work, and ultimately a resolution was passed to the effect that "each man was at liberty to do as he pleased," go to work or stop out.

Strike through a recent Act of Parliament.—A strike of the chain-cable makers of the north of England (which will extend to other parts and to the metropolitan iron-works) has occurred, for an unexpected reason. The Trinity House Brethren, the Admiralty, and the Board of Trade, finding that shipping have been long supplied with defective iron cables, by which vessels have been lost in far greater number than from bad anchors, introduced a Bill into Parliament to remedy this serious evil; and now the Chain-Cables Act has come into force, which requires that before a chain is passed, it shall undergo a test, according to size, up to 40 to 50 per cent. above the Admiralty strain, so as to prove the quality of the iron and workmanship. The additional proof has caused the chain-cable artizans to use more skill, labour, and time, than in former days, and for these extras they have demanded an advance of wages at the rate for heavy chains of 6d. per cwt., and then reduced their request to 3d. per cwt. The employers, however, hold out against both demands; and as the men, since the Act in question was mooted, have husbanded a fund to meet a strike, the chain-cable making is likely to want many links before the men make any more cables. The dispute opens up some serious misgivings as to past shipwrecks.

ACCIDENTS.

Fatal Scaffolding Accident near Newport.—The platform part of the scaffolding of a new bridge now in course of construction over the river Usk, near Newport, recently fell into the river. One man was drowned; two are missing; and four others injured, two of them seriously.

Fall of a Building at Walkley.—The gable end of a dwelling-house in course of erection in Industry-street, Walkley, has collapsed, and caused considerable damage to property, though, fortunately, not to life. The gable end had lately appeared very insecure. The bed in which the tenant and his wife were wont to sleep, was completely overwhelmed with building material of great weight.

A Building Set on Fire by Lightning at Blackburn.—The stables belonging to Miss Thwaites, Beardwood Cliff, near Blackburn, were recently set on fire by lightning. The house being two miles distant from the town, the roof fell in before the engines could arrive. The stables are of recent construction, with a roof of pitch pine, and the damage done will be about 300*l*. The horses were got out of danger with great difficulty. A pear-tree on the north side of the stables was split by the electricity, and the coachman was thrown to the ground. No person, however, was injured.

Fatal Fall of a Bricklayer in Belgravia.—At 134, Ebury-street, Belgravia, a bricklayer, in the employ of Messrs. Walter & Sons, builders, Pimlico, was walking along the parapet, which is a very high one, and occupied by officers of the Footguards, quartered in Chelsea New Barracks. He fell head foremost on to the hand-rail of the area steps, and from thence back on to the spikes, and turned over on to the stone, smashing rails and stone, and deluging the pavement and area-steps with blood. A lady and gentleman passing by narrowly escaped the body falling on them, but were covered with the blood spurting from the poor fellow's head.

Fatal Fall from a Furnace.—An inquest has been held at New Town, Millom, says the *Carlisle Journal*, on the body of Thomas McWilliam, aged 32 years, who had met with a fatal accident on the previous day. Deceased was engaged at the Millom Ironworks, and about half-past three o'clock in the morning he was at work filling metal into the furnaces with a wheelbarrow. Near where he was walking along on the top of the furnaces there is a lift used for raising the ore from the ground to the top, which is a distance of 50 ft. Down this lift McWilliam by some means or other fell, and met with immediate death. The jury returned a verdict of "Accidentally killed," but as this was the second death of a similar nature at that place they recommended that a gate should be placed in front of the lift.

Fatal Fall at Arborfield, Reading.—An inquest has been held before the county coroner, at Reading, on the body of John Buckland. Emma Hiscock said deceased was repairing a porch. Hearing a "crash" I went down at once and

found deceased on the ground and the ladder broken. He appeared dead. Only about three minutes elapsed from the time I saw him alive till I found him dead. No one was working with deceased, nor was any one near him at the time. Just before the fall deceased cautioned me against letting the children get under the ladder as it was unsafe. Deceased was perfectly sober. A labourer said, I spoke to deceased during the day, and he told me he was afraid of his ladder as it was very weak. Deceased brought the ladder with him. A verdict of "Accidentally killed by a fall from a ladder" was returned.

Great Fire in Gateshead.—One of the most destructive fires that have ever occurred in Gateshead has just taken place. The scene of the fire was the well-known saw-mills and timber-yard of Messrs. Heggie, which are situate in Hillgate, about half a mile from the Tyne Bridge. The portion next and highest up the river was occupied as a timber-yard, whilst lower down, and stretching from the shore to the narrow street which leads to Hillgate, were the extensive planing and saw mills. Adjoining these was the tar-yard of Messrs. Heggie, who are also rope-manufacturers. The fire spread with such rapidity that the entire premises from end to end was one mass of fire. Even a new crane, which cost 300*l.* some short time ago, fell and was broken in several pieces. Messrs. Heggie have been very unfortunate, having been burnt down before on one or two occasions. The damage is estimated at between 20,000*l.* and 30,000*l.*, which is partly covered by insurance.

SCHOOL BOARDS.

London.—I am in a position, says the London correspondent of the *Weekly Scotsman*, to give you an idea of what the total cost of the operations of the London School Board will be for providing school accommodation for the 100,000 children needing it. The first sum raised by the Board was 40,000*l.*, which means a rate of a halfpenny in the pound all over the metropolis. The next sum was 75,000*l.*, which a rate of little more than three-farthings in the pound would make up. A further sum of 62,000*l.* was asked, which represents about another rate of three-farthings in the pound. It is estimated that this will be all that the Board will require to provide for the 100,000 children up to March, 1874, so that the total cost will entail a rate of about twopence and the one-tenth of a penny or a halfpenny a year, for the three years and some months which the Board expect to exist. It is intended to apply again next session for an Act of Parliament to continue the tenure of office of the present members for five or six months beyond the three years, so as to enable them to complete the work they have entered upon.

Sheffield.—The first schools built by a school board in Yorkshire have been opened with some little ceremony by the board, in Sanderson-street, Sheffield. The schools are of stone, and have cost something like 5,000*l.* Convenient playgrounds are attached.

Miscellanea.

Water-supply for Fires at New York.—In the *American Gaslighting Journal* is an article quoted from a contemporary in which it is stated that there is a project in New York for an indefinite supply of river-water in case of fire, with powerful engines for raising it, together with a system of special mains throughout the city. Power could also be sold to warehouses, stores, and manufactories. Five millions of dollars are mentioned as the probable cost of establishing the new works; and this sum would, at all events, it is said, cover the cost of works for supplying the lower part of the city with water, supposing the new system to be confined to that quarter which is in greatest danger from the present lack of pressure; and it is just in this district that small motors are most in demand. The sale of power to 500 buildings at an average of 1,000 dollars each, would, it is estimated, pay the interest on that sum, and perhaps the cost of maintenance.

Manchester Aquarium Building.—Good progress is being made with this building. It is now almost a matter of certainty that the building may be open in May, in time for the Whitsuntide holidays.

Dr. Borlase, the Cornish Antiquary.—Mr. W. Copeland Borlase, of Castle Horneck, author of the valuable work on "Cornish Sepulchral Monuments," reviewed by us last week, has opened the session of the Penzance Institute, Mr. Thos. Cornish, the newly-elected president of the society, presiding. From a report in the *Cornish Telegraph*, it appears that Mr. Borlase read a paper on the well-known Doctor Borlase of the last century. The doctor at first lived at his father's manor-house, at Pendeen, St. Just, a house possessing many noteworthy features and associations, but the rectory of Ludgvan soon became Dr. Borlase's life-long abode. One aspect of the doctor's many-sided life dwelt upon was his communications with the fashionable and literary world, with which his connexion was largely kept up through Dr. Oliver, a Cornishman, who became the chief physician at Bath. Letters from Dr. Oliver were read, and two unpublished from Pope to Dr. Borlase were referred to, in one of which is given a fuller description than any other by the poet himself of his grotto, which was much enriched by Borlase's presents of minerals. The scientific labour of Dr. Borlase might be divided into three parts: the earlier occupied by archæology; the middle age by the history of natural phenomena; while his latter days were taken up in making collections for a parochial account of Cornwall, containing the heraldry and genealogy of the county. In his day there were very few antiquaries worthy of the name. In 1754 appeared the first edition of the "Antiquities of Cornwall." Though it contained some theories not now accepted, its facts were unimpeached and valuable. Borlase's age was an age of collecting without a sufficient rudimentary knowledge to make any adequate generalisations possible. Gropings in the dark were many of the best efforts. A manuscript volume, however, by Dr. Borlase, contained many views on submarine upheaval and the causes of earthquakes, which might be placed almost side by side with those of Sir Charles Lyell; but the volume was not published. Mineralogy also engaged much attention, and was the subject of many letters between Borlase, Gronovius, Linnæus, &c. Every morning Dr. Borlase rose at five, and every evening retired to rest at nine, continuing these hours until his death at Ludgvan, on the 31st of August, 1772.

The Buried Valley of the Mersey.—A paper has been read before the Liverpool Geological Society, by Mr. T. Mellard Reade, C.E., F.G.S., on this subject. It was of a mixed engineering and geological character, commending itself to those who have a taste for practical science. Mr. Reade stated that he was led to investigate the form of the rocky bed of the river Mersey, by finding that in the upper reaches of the river the rock lay at a depth considerably below the deepest part of its present bed, which is situated between Seacombe and the Rock Lighthouse. The ancient or pre-glacial course of the river was traced past Runcorn Gap, and the question of its course onwards to the sea next considered. The author's reasons for not considering the valley to be a lake-basin were also given; and that there had been an outlet, at a regular gradient, to the sea, or a sub-aërial valley, where the estuary now is, when the land was higher, with respect to the sea-level, was argued from the following facts:—That a bed of water-worn gravel or stones, mixed with red sand, though sometimes absent, usually lay upon the rock. That this red sand being due to the grinding down of the Triassic rocks, when the whole country was enveloped in ice, like Greenland of the present day, if there had been no outlet for the sub-glacial river, a great accumulation of *débris* would have taken place in the bed, which, on the supposition of an outlet, was being continually carried seaward by the sub-glacial river. It was also shown that, in Greenland, rivers coursed over the surface of the ice, and then, plunging below it, flowed underneath to the sea.

The Linoleum Manufacture.—The report of the Linoleum Manufacturing Company (Limited) shows an available total for the year of 22,583*l.*, including a previous balance of 2,435*l.*, and recommends an appropriation of 19,500*l.* to a dividend at the rate of 20 per cent. per annum (of which 4,766*l.* were paid in July), leaving 3,083*l.* to be carried forward. For the previous year the dividend was also 20 per cent., 2,000*l.* were added to reserve, and 2,188*l.* were carried forward. Linoleum floor-cloth is a decided improvement on wax cloth. We believe the paint in it is mixed with cork, and the colours and designs generally are good.

The Early Monuments of the British Isles.—Mr. John S. Phené, F.S.A., has delivered a lecture in London, on the more recent discoveries of archæological relics of remote antiquity. In the course of his lecture he gave a *resumé* of his own explorations conducted during the past year. These extended at intervals from May to December, and comprised the examination of tumuli on the Cotswold Hills; of cromlechs at Harlech and other places in Wales, and in the counties of Dublin, Down, and Antrim, in Ireland; a somewhat extensive survey of the round towers of Ireland; and a close and critical examination of the domed structures on the Boyne Water. Various interesting results of a novel character attended his examinations, such as a distinct identity being established in the construction of the cromlechs in the north of Ireland and in Argyleshire, by which a strong corroboration is given to the historical tradition of the invasion of that part of Scotland now known as Argyleshire by the Irish Dalriads. He found appearances of a careful and systematic erasure of, he assumes, incised devices, or perhaps records, on the stones in the chambered tumulus of New Grange, the parts not so erased having the various emblems so well known to antiquaries still upon them. In the neighbourhood of triple-peaked mountains in Wales he discovered Celtic remains similar to those he had identified with the localities of such mountains in Scotland.

Box Edgings.—This is a very good time to make new and re-form existing edges of box. The *Gardener's Magazine* gives some hints on the subject:—The ground is made ready for the reception of the plants by being made level, and then trodden or well beaten down to a level with the existing walk, or the intended height of the one to be made. A trench, about 6 in. deep, must be neatly taken out, the soil brought out into the walk, and the back of the trench made perfectly straight for the pieces of box to lie against. The side of the trench should be made rather sloping, and in laying in the box keep it in its place with the left hand, and fill in a portion of the soil with the other; when a tolerable length is done, fill a further portion of the soil in with a spade, give it a good treading, and then fill the remaining part in, and when made firm the operation is complete, and nothing remains but to put the gravel in its place. In preparing the box for planting, strip off the moderate-sized sprigs with a portion of the roots adhering, and trim so as to form a miniature fan. The tips of the shoots should be cut off, and also a part of the old hard wood at the bottom when it is too long, and likely to prevent the piece lying nicely in its place. Each spray should be as near in size as possible, to prevent any unnecessary trouble when laying it in.

The Proposed South London Museum.—A public meeting has been held at the Lambeth Baths, Westminster-road, in promotion of the movement now in progress for the establishment of a museum in the South of London. Mr. John Locke, M.P. for Southwark, occupied the chair, and was supported by his colleague, Colonel Beresford, M.P., and a large body of local and influential gentlemen. The chairman, in opening the proceedings, expressed his hearty concurrence in the object of the meeting, which, if carried out, would tend to the great advantage of the working population of the southern districts of the metropolis. The establishment of a museum and gallery of fine arts in South London would go far to educate the masses of the people. He pointed out the advantages which had resulted to the East end of London by the establishment of the Bethnal-green Museum. There was a large piece of ground, called the Glebe Land, at Newington Butts, which could, he said, be obtained as a site for the proposed museum. Mr. Clements, the chairman of the provisional committee, detailed the progress already made by the movement, which has been of the most encouraging character. The meeting pledged itself to use its best efforts to ensure the success of the movement, and other resolutions in furtherance of the object of the meeting were adopted.

The Dorchester Surveyorship. — Mr. John Wood, of Wolverhampton, has been appointed surveyor of the borough of Dorchester, at a salary of 120*l.* per annum, it being an understanding, seemingly, that if he be hereafter appointed also inspector of nuisances an addition to his salary must be made.

Mr. Stansfeld and the Surveyors of Highway Boards.—A deputation, appointed by the District Surveyors' Association, have waited upon Mr. Stansfeld at the Local Government Board, to urge upon him the better management of highways generally, and placing the appointment of surveyors of highways in the hands of the Local Government Board. Major Allen, M.P., in introducing the deputation, said they represented an association comprising 130 highway districts. They desire to have their appointments taken out of the hands of the ratepayers, and to be under the Local Government Board, so that they might be placed on a footing sufficiently independent to allow them to do their duty without fear or favour. Mr. Edward Hicks, chairman of the Surveyors' Association, said they wished to be under the control of the Local Government Board in a similar way to the officers under the Public Health Act. Mr. Stansfeld said he did not think they could make the charge for the maintenance of roads an imperial charge; but there was a strong feeling where there were great thoroughfares near populous towns, for widening the area, so that the cost might not fall so heavily upon a small district. A county charge would necessarily imply county control.

Coal *versus* Colliers.—A miner, referring to the new advance of coal, pertinently asks whose fault it is this time that coals are raised. For twelve months past it is the colliers who have been popularly blamed for forcing up the price of coal by their reckless demands, but it is high time, he thinks, that the facts should be known. "Eighteen months ago," he points out, "coal that is being sold now for 17s. and 17s. 6d. at the pit-mouth, sold for about 8s. or 8s. 6d. per ton. I believe," he says, "it is the opinion of the public that we miners are receiving the benefit of this enormous advance of coal; but I will tell you the facts: we had 6d. per day rise in October, 1871, and we have received no advance of wages since. During the past year, we had our hours of labour reduced from eleven to eight, but the 6d. rise we had in 1871, and the reduction of hours together, would not make more than 2s. 6d. per man per day. Now let us assume there is one ton of coal per day drawn per man,—and coal is now just as much again per ton as it was in September, 1871,—there is 6s. 6d. or 7s. clear profit more than there was two years ago on one single ton of coal." They who can cheat the public in this way would, under far different circumstances, make expert pickpockets.

New Reredos in St. Mark's Church, Lewisham.—A reredos of Caen stone has been erected in this church, the design of which comprises a centre portion of three moulded arcades with marble clustered shafts, the arcades the width of the altar-table, and pinnacled supports crocketed on either side, containing four niches for the reception of figures of the Evangelists. The middle compartment of the arcade is deeply recessed, and a statuary Calvary cross on a gold ground placed therein, and above it is erected a light tabernacle-canopy, supported on four polished Peterhead shafts, with the angels Michael and Gabriel supported on pinnacles on either side. In the panels of the side compartments are carved on a diapered ground the symbols of the Agnus Dei and the pelican, and in the spandrels the Dove and the Alpha and Omega. The whole is profusely carved, and has been studied throughout with a view to its emblematical teaching. The work has been executed by Mr. George Whittingham, of Kennington Park-road, from designs by the architect of the building, Mr. William C. Banks, of Gracechurch-street, who also has designed the scheme for filling the whole of the traceried windows with stained glass. The portion of the reredos already erected is the gift of Mr. J. Lonsdale.

St. Michael's, Highgate.—The reredos of this church has just been revised and restored by Messrs. Cox & Sons. Over the altar-table has been placed a carved stone panel representing, in life-sized figures, the Breaking of Bread at Emmaus, the figure of Christ being central, with one of the disciples on either side. The background is filled with tracery and carved foliage, and in the panels on each side are the Commandments, illuminated. The tracery is filled in with the passion-flower, the Agnus Dei, and the Pelican. The lower portion is diapered in rich brown and gold. A text runs through the whole,—"Their eyes were opened, and they knew Him."

The Bourne at Caterham.—The Bourne water has again made its appearance, and last week it was running strongly through Caterham Valley. Aubrey, the historian, says the *Croydon Times*, records a curious superstition concerning this subterranean stream. In speaking of Caterham, he says,—"Between this place and Coulsdon, in the bottom, commonly called Stoneham-lane, issues out sometimes (as against any change in our English Government), a Bourne, which overflows, and runs down in Smitham Bottom to Croydon. This is held by the inhabitants and neighbourhood to be ominous, and prognosticating something remarkable approaching, as it did before the happy restoration of King Charles II., of ever glorious memory, in 1660;—before the Plague of London in 1665;—and in 1688, the era of another change of the constitution." The stream has already reached the Brighton-road, where a culvert has been made by the local Board to receive it into the Wandle. Before the erection of this culvert the southern portion of the town and the Old Town used to be inundated at its rising.

Paper Wheels.—We now learn from the monthly scientific paper in *Chambers's Journal* that the article in question is made by treating waste-paper, or paper-pulp, or vegetable fibre with chloride of zinc [would not oxychloride of zinc be best?], and subjecting it to pressure, whereby it becomes hard and tough. The hardness and toughness may be varied according to the strength of the bath of zinc solution, and the material produced will be flexible as leather, or rigid as wood. It takes colour readily, and can be used as floor-cloth; it is a substitute for leather, both soles and uppers; can be fashioned into gas-pipes, handles for whips, for saws, and many kinds of tools; into buttons, combs, pulleys, and so forth, and into large sheets for roofing. It promises to be useful for ornamental purposes; perhaps, for coats and trousers; and paper already manufactured may be toughened by being passed, unsized, through the chloride of zinc bath.

Borrowed Capital for Land.—Mr. Mechi, says:—The time is fast approaching when the surplus capital of trade, commerce, and manufactures, will find its way to a food-producing channel. There is plenty of room for it, without any fear of its overflowing the banks. A farmer who owns the land he farms said to me last week,—

"Twenty-two years ago I borrowed between 7,000*l.* and 8,000*l.* of the Government loan, paying 6½ per cent. per annum to liquidate principal and interest in twenty-two years. I drained all my stiff land 3 ft. deep and a rod apart. The twenty-two years have expired, and now I am free of charge, and have all my drains as perfect as at first, barring sundry removals of roots and trees, &c. My land and crops have been improved, and it has been altogether a satisfactory and profitable affair."

Well, then, for 6s. 6d. an acre (less than the price of a bushel of wheat) annually during a period of twenty-two years, this land has been permanently improved, the produce greatly increased, there has been a large augmentation of capital, and profit to landowner and tenant and the country at large. Why is it that some 20,000,000 of acres are still awaiting a similar manipulation?

Opening of New Picture Gallery in Brighton.—The Picture Gallery in connexion with the Free Library and Museum has been opened, but without any inaugural ceremony, the formal dedication to the public of the entire building having been made during the visit of the British Association in August last. The permanent opening of the Library and Museum has been delayed by circumstances, and up to the present time the arrangements for the picture-gallery only have been completed. The Library and Museum will, however, be shortly finished in their entirety. Taken as a whole, says the local *Herald*, the exhibition, both in oil and water colours, is one of the finest to be found in the provinces, including as it does the works of Phillips, Millais, O'Neil, Faed, the Linnells, Solomon, Frith, Frère, Marcus Stone, Sir John Gilbert, T. S. Cooper, Hunt, Cox, Copley Fielding, Vicat Cole, Richardson, De Wint, &c.

Meeting of Grainers and Marblers.—Mr. Jas. MacIntosh thinks it an error to describe the meeting held by this trade on the 17th ult. as a "meeting for the formation of a trade-union," "the object being that of benevolence." He adds that the purposes of the society were not set forth by him, but by one of the promoters of the meeting.

Japanese Progress.—A prospectus of *Tai Sei Shimbun*, or *Great Western News*, a native Japanese paper, edited by a Japanese resident in London,—Office: 3, George-yard, Lombard-street,—has been issued. It says the immense advance which Japan is making in material progress renders the present moment opportune for the establishment of a newspaper in the metropolis of the West, to serve as a means of communicating further knowledge of Western arts and policy among the millions of Japanese who are now desirous of learning all they can of foreign nations. The paper will be illustrated, so as to convey the most vivid ideas of the objects explained, and to simplify description. A portion of the first number will be circulated among the Japanese reident in Europe and America, and the remainder will be forwarded to Nagasaki, Yokohama, and Yedo, for circulation in the Japanese Empire.

Monumental: St. Mary's Church, Eynesbury.—In the porch of this church there has just been erected a mural monument of Caen stone, in the Early English style of architecture, to the memory of the late Mrs. Humbley. The inside arches, with moulded bases and carved caps, are supported upon marble shafts, forming three spandrels, in the centre of which is the inscription, in indelible letters, in a quatrefoil within a circle of marble; and in the side spandrels are carved, in bold relief, the lily (on the left) and the rose (on the right). On each side, also, is a moulded sunk panel. The shafts are green serpentine marble, the quatrefoil and circle being statuary Marble. The monument has been erected by Mr. W. Wade, of Eaton Socon, St. Neots, by the direction of Captain Humbley.

Self-working Ship Ventilation and Ship Pumping.—An invention of great advantage to ships has been successfully tried at Plymouth. Foul water and foul air in the lower part of the ship are both pumped out by the mere rolling of the ship. Two iron cylinders, connected below by a tube, are placed one on each side of the vessel. From each cylinder a pipe descends into the air or water that is to be pumped out, and a similar pipe rises as an outlet above. The cylinders are filled with quicksilver, and being connected below, as already stated, each roll of the ship produces an alternate rise and fall of the quicksilver, creates thereby a vacuum, into which the bilge-water rushes, and is pumped out at the vent in a continuous stream. The cylinders which expel air are filled with water; but their action is the same as here described.

Crags and Cairns.—Under this title Mr. Garner, F.L.S., has read a paper in the Stoke Town-hall, before the North Staffordshire Naturalists' Field Club, on the boulders and other traces of glacial times in that part of the country, and on implements of the glacial drift and ancient megalithic and other monuments. Views of cromlechs and dolmens, and stone circles, were exhibited, and also flint implements. A paper, by Dr. Davis, was also read as to barrows and caves. Dr. Davis was wrong in supposing that Professor Huxley regarded the Neanderthall skull as evidence of the supposed "missing link" between apes and men. To the best of our recollection Huxley held precisely the contrary opinion: yet he is spoken contemptuously of by Dr. Davis on this false supposition.

Malden and Worcester Park.—The new entrance over the green joins the old road opposite the late lodge. A new lodge and three villa residences have been erected, with conservatories attached. These new buildings, now nearly completed, are in the Swiss style. The ground-floors are of red brick, with stone dressings, and the first floors and gables are of timber and stucco, with roofs of ornamental tiling. The gables are finished with verge boards and finials. The architects are Messrs. John Giles & Gough, of London; and the builders are Messrs. Hibbins & Trasler, of Kingston. The whole of the works were carried out under the superintendence of Mr. Mark H. Judge.

Technical School for Edinburgh.—A preliminary meeting of persons favourable to the establishment of a technical school in Edinburgh has been held, under the presidency of the Lord Provost. Resolutions were adopted to the effect that such a school was desirable, and that a portion of the surplus funds of Heriot's Hospital might very properly be set apart for its maintenance. A committee was appointed to prosecute the matter.

Saxon Antiquities.—A collection of Saxon antiquities of rare value has just been presented to the library and museum of Trinity College, Cambridge, by the sub-librarian of the society. For some time past excavations have been going on on the site of an Anglo-Saxon cemetery situate at a place known (and described on maps 200 years old) as Edix-hill-hole, near Orwell, Cambridgeshire, and some curious remains have been brought to light. The donation includes various implements in iron, as spear-heads, shield-bosses, and handles, &c., and some articles used in hunting and in domestic life. There are also articles of pottery.

The Smoke Nuisance.—The high price of fuel is reviving an interest in South Staffordshire in the question of smoke consumption at the iron-works and other manufacturing establishments. At the last meeting of the Wolverhampton town council, a resolution was carried by a slight majority in favour of instituting proceedings against manufacturers at whose works the smoke nuisance existed. The town clerk, however, said that the majority was so small that he should decline the responsibility of acting in the matter until it had been brought a second time before the council.

Colliery Gas Lighting.—The Marquis of Lothian has just completed new gasworks to supply with light the colliery offices, home farm, and colliery villages on the estate of Newbattle Abbey, and eventually the underground workings in the coal-mines. The works are erected at the village of Newtongrange. The gas is clear and brilliant, being made from the best parrot coal. The whole works have been carried out under the supervision of Mr. Davidson, manager of his lordship's coal works.

Rise in the Value of Property.—The owners of property situate at Carbrook and Attercliffe, Sheffield, have unanimously resolved to raise all cottage house-rents by amounts equal to 15 per cent. The determination has been come to, owing to the great demand for dwellings, consequent upon activity of trade, scarcity of accommodation, high price of building materials, labour, and land. The resolution affects many thousands of houses, chiefly situate near the great iron and steel works.

The Leicester Municipal Building Question.—A meeting of the Municipal Buildings Committee, consisting of the whole of the Council, has been held at the Town-hall, Leicester, for the purpose of taking into consideration the question of municipal buildings. It was ultimately resolved "That the municipal buildings be erected upon the old cattle-market site, with a frontage to Horsefair-street, Bowling Green-street, and Bishop-street, and that the question of plans and the erection of municipal buildings be referred to a sub-committee to be reported upon at a future meeting of the committee of the whole council."

Wax-Chandlers' Hall, Gresham-street West.—The Court of this ancient company met at dinner last week for the first time since their hall was decorated. The works include an improved system of lighting and ventilating by means of a large sun-burner, which brings into strong relief the decorations, Elizabethan in character. The works have been executed by Mr. Edward Jenner, of Belgrave Mansions, under the superintendence of Past-Master Quallett, surveyor.

Charges under the Workshops Regulation Acts at Dudley.—At the Dudley Police Court, Mr. Jones, sub-inspector of factories, appeared in support of a number of charges against different persons for contravening the Workshops Regulation Acts. Fines of 10s. in each of several cases, and of 20s. in one case, were inflicted against employers, and of 1s. against parents, for allowing children to be worked beyond the proper number of hours per day, and for want of educational certificates.

Fire-damp.—Mr. Charles Kidd, M.D., writes to the *Times* as follows:—

"An interesting discovery has been made in America, the birthplace of our chief discoveries as to the reactions of gases, vapours, &c. Blake, of Boston, gives several cases of persons taken apparently dead out of coal mines restored to life by inhalation of oxygen. This gas seems a perfect antidote to fire-damp; in some cases there was relapse when the oxygen was discontinued, but on resuming its inhalation the patients were saved. Next to the value of the Davy-lamp must rank the great efficiency of this gas in the too-often painful scenes in coal mines, where hitherto nothing was done to restore life, as no antidote was known."

Trees in Brighton Streets.—Another step in the planting of the streets of Brighton with trees has been taken. Two lines of fine young elms (presented by the Earl of Chichester) have been planted on the outer skirts of the central pavement of the Steyne. It is intended to plant two other lines just inside the Steyne enclosures, to run parallel with those outside, so as to form an avenue from Castle-square to St. James's-street. Eastern-road is also to be planted from the College to Kemp-town, and Buckingham-road on both sides.

Public Health Act, 1872: Engineering Department.—Mr. Robt. Rawlinson, C.B., has been appointed Chief Inspector and Consulting Engineer; Major Tulloch, R.E., has been appointed an Inspector. Mr. Rawlinson ceases to hold country inquiries, as formerly, but may be called upon for any special report. His duties in future will be chiefly in the Local Government Office, Whitehall.

The late Mr. William Harry Rogers.—We are sorry to hear that this gentleman, long well known as a designer and draughtsman, died on Sunday night, the 19th ult., of *phthisis pulmonalis*, after ten months' illness. Mr. W. H. Rogers, who was the son of the eminent wood-carver of that name still enjoying a hearty old age, was but forty-seven years of age, and leaves a widow and six children.

The Sea-wall at Dawlish.—The south-westerly gale of Saturday night and Sunday caused high tides to undermine a further portion of the sea-wall against the South Devon Railway at Dawlish, about 120 yards above the last breach. Some 25 yards of foundation have been washed out. The wall for some distance is much endangered, and masons have been busily employed in shoring it up.

M. J. B. A. Lebas, the eminent French engineer, is dead. It was he who placed the obelisk of Luxor in the Place de la Concorde. He was born in 1797, and was a pupil of the Ecole Polytechnique. In 1849 he published a memoir, entitled, "L'Obélisque de Louqsor, Histoire de sa Translation à Paris."

Explosion of Gas at the New Relief Offices, Islington.—An explosion of gas has occurred at the New Relief Offices and Vaccination Station, now in course of erection in Islington, whereby two grainers have met with severe injuries.

The Royal Academy.—At a meeting of the members of the Royal Academy on Tuesday night there were elected as associates—painters, Messrs. H. W. B. Davis and J. Hodgson; and engraver, Mr. T. Oldham Barlow.

The National Theatre at Washington.—The National Theatre in this city has been totally destroyed by fire.

TENDERS

For a pair of semi-detached villas at Hastings. Mr. G. Stooke, architect. Quantities supplied:—

Tapper	£2,900	0	0
Cousins (accepted)	2,620	0	0

For alterations and additions to servants' offices, Sandridge Court, Surrey, for the Right Hon. the Earl of Cottenham. Mr. R. Martin, architect. Quantities supplied by Mr. Fred. Sparrow:—

Bridgman, Nuthall, & West	£955	0	0
Ward	790	0	0
Jarrett (accepted)	760	0	0

For new premises for the *Standard* newspaper, St. Bride-street and Shoe-lane, City. Contract, No. 1. Excavations and concrete. Mr. Horace Gundry, architect:—

Baker & Son	£1,990	0	0
Lucas, Brothers	1,650	0	0
Smith & Co.	1,597	0	0
Holland & Hannen	1,544	0	0
Perry & Co.	1,500	0	0
Trollope & Sons	1,488	0	0

For the erection of two warehouses in Wood-street-square, for Mr. T. Loveridge. Mr. Herbert Ford, architect. Quantities by Hovenden, Heath, & Berridge:—

Myers & Sons	£3,680	0	0
Scrivener & White	3,669	0	0
Nightingale	3,470	0	0
Brass	3,439	0	0
Perry, Brothers	3,393	0	0
Stimpson & Co.	3,383	0	0
Williams & Son	3,330	0	0
Kilby	3,252	0	0
Henshaw	3,231	0	0
Crabb	3,100	0	0

For alterations, repairs, and additions to a house on Beeston-green, Bedfordshire. Mr. Lacy W. Ridge, architect:—

Camplin	£888	0	0
Dabb	865	0	0
Twelvetrees	778	0	0
Harvey	684	0	0
Warr	670	0	0
Coles	619	10	0
Dunham	595	0	0
Prout	575	0	0
Carter	549	0	0

For building in Bread-street, Cheapside. Messrs. Tress & Innes, architects:—

Hawtrey & Son	£13,617	0	0
Hill & Son	12,720	0	0
Browne & Robinson	12,607	0	0
Brass	12,570	0	0
Conder	12,131	0	0
Sewell & Son	11,985	0	0
Fish	11,525	0	0
Peto, Brothers	11,145	0	0

For villa residence, with studio, at Haverstock-hill, for Mr. G. G. Kilburne. Mr. T. Batterbury, architect:—

Linzell & Son (accepted)	£1,500	0	0

For the erection of two new business premises in the High-street, Bedford, for Mr. W. Roff, confectioner. Mr. F. T. Mercer, architect. Quantities supplied by him:—

Foster	£3,400	0	0
Cunrin	3,229	0	0
Spencer	3,200	0	0
Taylor	3,139	0	0
Moore	3,122	0	0
Corby	3,113	0	0
Chibnall	3,055	0	0
Haynes	3,052	0	0
Potter	3,050	0	0
Lilley	3,045	0	0
Hull	3,000	0	0
Carter	2,909	0	0

For the erection of new shop, &c., and alterations to 522, Kingsland-road, for Messrs. M. H. Runchman & Son. Mr. W. Seckham Witherington, architect:—

Elkington (accepted)	£500	0	0

TO CORRESPONDENTS.

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PROSPECTUS.

This Company is established for the purpose of acquiring and commercially developing the British and Foreign Patents for Improvements in the manufacture of Gas for Lighting and Heating purposes, known as Ruck's Patents.

The invention has not been brought before the public until after it has been thoroughly tested on an extended and practical scale, with results conclusively favourable to its great commercial value.

The advantages to be derived from the manufacture of gas by this process are exceedingly important, combining,—

1. A very large saving in the cost of manufacture.
2. The production of gas of greater purity and brilliancy than ordinary coal gas.
3. A saving of labour in gas-making to the extent of 50 per cent. thus reducing to a minimum the liability of strikes.
4. Simplicity of apparatus.
5. Adaptability to the lighting of Houses, Factories, and Mansions, Railway Stations, &c. situated at a distance from gas-works.
6. Facility of adaptation to existing gas-works at small cost.

The new gas, although produced from hydrocarbon vapour, differs entirely from air-gas, as instead of common air, a specially-prepared gas, of a permanent character, is employed, which requires far less spirit to give it illuminating power, and possesses the further advantage of being able to travel through pipes without deposit or loss of illuminating power. It is also, unlike some air-gas, unaffected by changes of temperature.

It will be of especial value where heat as well as light is required, since, before the gas receives its illuminating properties, it is a powerful heating gas, and produced at so cheap a rate that it must prove a source of extended usefulness, and of important revenue to this Company.

In addition to the above, the Patents comprise a new Process for the manufacture of gas for Heating purposes, also of very great value.

The process applied to Gas for Lighting purposes has been submitted to the most rigid tests, at works specially erected and quite independently of the Patentee, by several of the most eminent Gas Engineers and Professional Authorities, whose reports in detail will be found enclosed, and it will be seen they agree unanimously as to the value of the Patents, both scientifically and practically.

The following are the gentlemen referred to:—
Messrs. Joseph Quick & Son, M. Inst. C.E. London.
R. P. Spice, esq. C.E. London.
F. W. Hartley, esq. Gas Engineer and Analyst, Westminster.
Henry Gore, esq. C.E. Consulting Gas Engineer, London.
Dr. James Louttit, M.D. M.R.C.S.E. Gold Medalist in Chymistry, Who has consented to join the Board of Directors.

In addition to the Patents granted for the United Kingdom, the necessary steps have been taken to obtain Patents for the following countries, from many of which a large business is expected:—

France	Brazil	Trinidad	Bahamas
Belgium	Argentine Republic	Barbadoes	Bermuda
Prussia	Uruguay Republic	Tobago	Cape of Good Hope
Russia	Paraguay	Turkey	Demerara
Bavaria	United States	Danubian Provinces	Chili
Austria	Canada		Newfoundland
Italy	India	Greece	Vancouver Island
Saxony	Ceylon	Egypt	Peru
Spain	New South Wales	Japan	Bolivia
Portugal	Victoria	St. Lucia	Venezuela
Sweden	Queensland	St. Kitts	Columbia
Denmark	Tasmania	Antigua	Guatemala
Norway	New Zealand	Montserrat	Nicaragua
Mexico	Jamaica		

The special process of manufacture of gas for lighting purposes under these patents is amply described in the reports of the above-mentioned gentlemen, by which it will be seen that a new discovery of immense importance has been arrived at.

By this process great economy in the cost of manufacture is effected, the cost of production of gas of 16½ candle-power delivered into the gasholder by the New Process being under 1s. 6d. per 1,000 cubic feet, while the present coal-gas (with coals at 29s. per ton) costs 2s. 4d. net per 1,000 cubic feet, being 40 per cent. higher than by the New Process.

A larger saving even than this will be effected in places at all distant from the coal centres, whilst in foreign countries, to which coal has to be transported for the manufacture of gas a saving of from 1s. to 3s. per 1,000 cubic feet will result from the adoption of Ruck's Patents.

In view of such very great economy, commercially, it is not unreasonable to expect the gradual adoption of the process by existing companies all over the world.

The accompanying reports speak highly in favour of the process as regards the production of illuminating gas of a permanent character, of high power, and of great purity; it makes no smoke, is not injurious to health, and from its purity will not injure plants, pictures, nor works of art of a delicate character.

Another advantage in the manufacture of gas by this process is the saving of labour (an important matter in the time of strikes and combinations, as shown in the recent gas stokers' strike), the saving being 29 men out of every 30,—that is to say, that one man is sufficient to perform the same work which has hitherto required thirty: the economy thus effected is self-evident.

With regard to the apparatus required for the process of this Company, existing gasworks can easily be adapted to the new process at a very moderate cost. The process can also be applied to single houses, mansions, factories, or other establishments at a distance from towns where this gas can be supplied, of equal power and brilliancy to gas in towns, but manufactured on the premises from simple apparatus, easily managed, free from risk, and not liable to get out of order, and at a low cost. A very large revenue is expected to be derived from this source alone.

With a view to enabling the most thorough tests to be applied to the process, and to give facilities for a full and complete examination of the results, the Company have erected works on a practical scale at Battersea, which gas engineers and intending shareholders are invited to inspect.

The Patents of the Company include, as above stated, a process for the manufacture of gas for the generation of steam and other heating purposes, which are alone of great value.

By such process gas can be produced at a cost of 7d. per 1,000 cubic feet, available for the generation of steam for steam vessels, and by its application the carrying capacity for cargo will be greatly increased.

The sources of revenue open to this Company are therefore of a highly remunerative character, and the Directors confidently look forward to most gratifying results from the adoption of their Patents.

The Directors have taken special pains to satisfy themselves of the value of the new process for practical purposes on the largest scale, it being their opinion that at no distant date it will, to a great extent, supersede the present mode of manufacturing gas.

Negotiations for the acquisition of the Company's Patent rights in several Foreign Countries are already entered upon, and apart from the large sums thus to be obtained, a moderate royalty for the use of the invention will alone, it is confidently expected, yield very large returns to the Shareholders.

The consideration to be paid to the Vendor for all Patents, British and Foreign, and for all future improvements by the inventor, is 50,000*l.* in cash, and 75,000*l.* in Shares of the Company; also one-tenth of the surplus profits in every year, after the declaration by the Company of a dividend of 25 per cent. and one-tenth of the net proceeds of any foreign Patents which may be sold for sums in gross.

In the event of no allotment being made to any applicant, the deposit paid will be returned forthwith, without deduction; should the Shares allotted be less than the number applied for, the surplus paid on application will go in reduction of the amount payable on allotment.

Scrip Certificates will be issued on receipt of the amount payable on allotment until the full amount of the Shares has been paid, when they will be exchanged for Share Certificates.

Copies of the Articles of Association of the Company and of the Agreement for the purchase of the Patents, may be inspected at the Offices of the Solicitors of the Company, Messrs. HARGROVE, FOWLER, & BLUNT 44, Coleman-street, E.C. London, and 3, Victoria-street, Westminster, S.W.

Applications, accompanied by the payment of 1*l.* for each Share applied for,—which must be for not less than 20 Shares,—will be received on the form enclosed, which can be forwarded either to the Consolidated Bank, Limited, Threadneedle-street, E.C. London; or to HENRY BROWNRIGG, Esq. the Secretary, at the Company's Offices, 31 and 32, Lombard-street, E.C. London.

Prospectuses and forms of application can be obtained of the Brokers of the Company, Messrs. HUGGINS & CO. 1, Threadneedle-street, E.C. London; or of the Secretary, at the Offices of the Company.

By order of the Board,
CLAUD HAMILTON, Chairman.
HENRY BROWNRIGG, Secretary.

31 and 32, Lombard-street, E.C. London,
January 24, 1873.

Cards of admission, available for Gas Engineers and others interested in this great enterprise, to see the Works at Battersea, can be obtained on application to the Secretary, or to the Engineers of the Company.

The following contract has been entered into:—

24th JANUARY, 1873.—Between WILLIAM ECKERSLEY, of the one part, and BENJAMIN SMITH, on behalf of the Company, of the other part.

THE NEW GAS COMPANY, Limited.

Capital, 500,000*l.*

First Issue of 250,000*l.* in 50,000 shares of 5*l.* each, of which 35,000 shares are now offered for subscription.

FORM OF APPLICATION.

To the Directors of the New Gas Company, Limited.

Gentlemen,—Having paid to your Bankers the deposit of 1*l.* per Share, I hereby request that you will allot to me ..... Shares of 5*l.* each in the New Gas Company, Limited, and I hereby agree to accept such Shares, or any less number you may allot me, and to pay the further instalments mentioned in the Prospectus, dated 24th January, 1873, and I authorise you to insert my name in the Register of Shareholders for such Shares as may be allotted to me.

Dated .....day of.....1873
Name (in full) .....
Residence .....
Occupation .....
Signature .....

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No. 6, Abbot's-walk, Reading, January 29th, 1873.

CITY of NORWICH.—NOTICE to ENGI-

NEERS, SURVEYORS, and ARCHITECTS.—Any Person desirous of obtaining the APPOINTMENT to the OFFICE of ENGINEER, SURVEYOR, and INSPECTOR of NUISANCES to the Corporation of Norwich, are requested to forward testimonials of qualification and competency, with particulars of age and previous occupation, addressed to the Town Clerk, Guildhall, Norwich, before ELEVEN o'clock on FRIDAY, the 14th day of FEBRUARY next. As the duties of such Engineer, Surveyor, and Inspector will comprise the Municipal as well as the Sanitary and Burials Board business of the Corporation, a candidate must possess a practical acquaintance with the ordinary works connected with engineering, drainage, sewerage, road-making, and street-paving; also to be competent to conduct surveys and levels, prepare plans of estates, buildings, and the necessary drawings and estimates of works of every description, and to take charge of the sewage pumping-station at Trowse, and the delivery of the sewage to the Corporation farms, and take all levels required on the lands for the utilisation thereof, and he will be held responsible for the due execution thereof, as well as any other works which may fall within the duties of an Engineer, Surveyor, Architect, or Inspector of Nuisances, under or in respect of the Municipal Corporations Act, the Sanitary Acts, and the City of Norwich Act, 1867, or any of them, or the bye-laws made in pursuance thereof, with the exception of Inspector of Markets, Provisions, Hackney Carriages, Common Lodging-houses, the Impounding of Stray Cattle, and the Supervision of Street Obstructions. The person appointed will not be allowed to take private practice, but may take consulting practice with the consent of the Executive Committee. The Corporation will provide Offices, Coals, Gas, and Cleaning, and an Assistant Surveyor and Draughtsman, and an Assistant Sanitary Inspector, who are to act under the direction of the person appointed. The salary will be 475*l.* per annum, from which the Surveyor is to provide, except as above mentioned, all assistance as may be required in order to carry out the duties appertaining to the Offices, to the satisfaction of the Corporation, and the several Committees thereof.—By order,
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